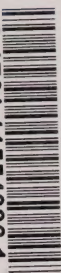


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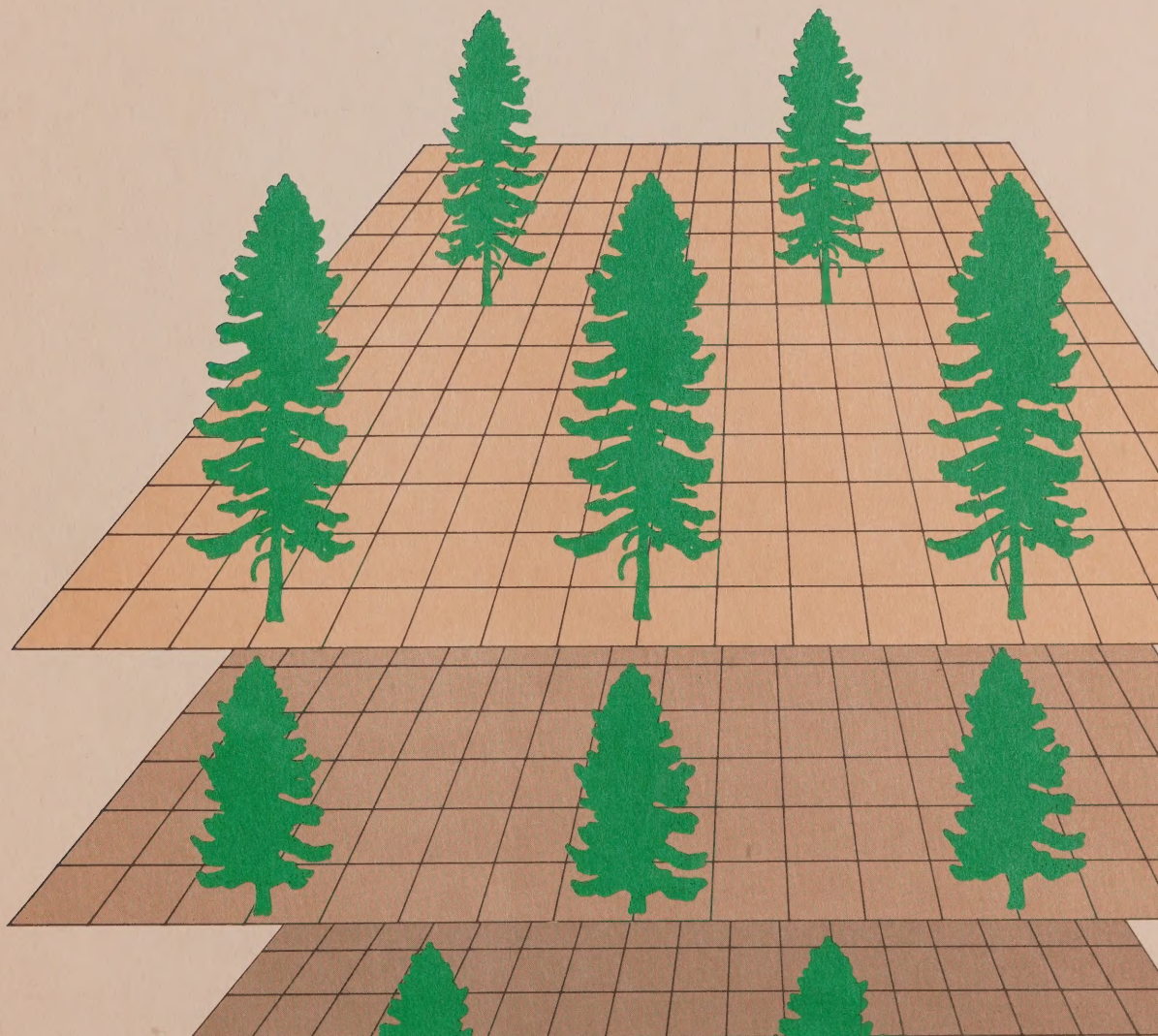
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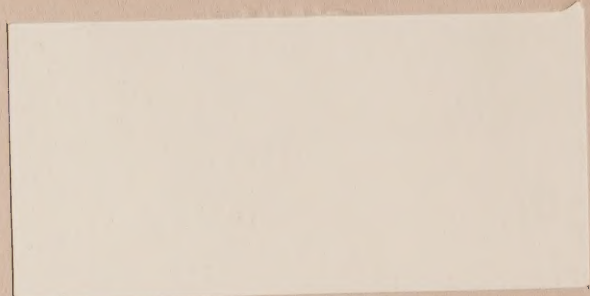
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A FOREST SECTOR STRATEGY FOR CANADA





A FOREST SECTOR STRATEGY
FOR CANADA

Discussion Paper

September 30, 1981

Sponsoring Minister: The Honourable
John Roberts

Ce document est aussi disponible en
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forestière du Canada*

September 30, 1981
le 30 septembre 1981

Discussion Paper
Document de travail

A FOREST SECTOR STRATEGY FOR CANADA
STRATÉGIE FORESTIÈRE DU CANADA

Sponsoring Minister:
Ministre responsable:

The Honourable John Roberts
L'honorable John Roberts

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A FOREST SECTOR STRATEGY FOR CANADA

A. OBJECT

1. This Discussion Paper examines policy options for increasing the contribution of the entire forest sector to the social and economic fabric of Canada. The objective is to provide a global assessment and decision-making framework based on international market opportunities and on various constraints that threaten the timber supply and undermine forest industry prospects for growth. Subsequent Memoranda to Cabinet will deal with specific programs and related resource requirements.

B. BACKGROUND

2. Discussions at Lake Louise in September 1980 resulted in a decision to have major policy review papers prepared for the principal resource sectors: fisheries, forestry, agriculture and minerals. In a subsequent decision, the respective resource ministers were requested to deal specifically with three fundamental issues: strengthening the resource base, adequacy of research and development, and new market development.
3. Policies and programs in other departments have an important bearing on the forest sector, especially the economic and institutional climate in which the sector operates. Accordingly the preparation of this strategy paper has coincided with extensive discussions within the Federal Forest Sector Strategy Committee, as well as individual consultations with officials of the Department of Industry, Trade and Commerce; Regional Economic Expansion; Energy, Mines and Resources; Finance; and the Ministries of State for Economic Development and Science and Technology; Treasury Board and the Natural Sciences and Engineering Research Council and others.
4. This paper also reflects a broader consultative process involving the provinces, industry, the Canadian Council of Resource and Environment Ministers, the Canadian Forestry Advisory Council, forestry schools and non-government organizations. As a result, major findings presented on timber supply, market potential, manpower and research needs, and the urgency of forest renewal represent a consensus in the forestry community, which includes industry, provincial governments and professional foresters.
5. The next section summarizes the varied dimensions of the forest sector and identifies the more significant constraints on expansion, thus paving the way for discussion of the separate elements in a forest sector strategy.

C. FACTORS

Forest Sector Dimensions

6. The economic contribution of the forest sector is summarized by the following data:

(i) Employment

Companies in the industry employ directly 310 000 workers:

| | |
|-----------------------------------|----------------|
| Logging | 58 000 |
| Wood industries | 123 000 |
| Pulp, paper and allied industries | 129 000 |
| | <u>310 000</u> |

(ii) Indirect Employment

Forward and backward linkages are relatively more powerful in the resource sectors than in service industry. Analysis of forest-based communities has shown that each job in the woods and mills is associated with one additional job locally and a second one elsewhere in the national economy. Thus, the forest sector accounts for approximately one million jobs in total, or nearly one job in ten.

(iii) Sales Value

The total value of shipments exceeded \$22 billion in 1980. Forest products make up 14 percent of all manufactured goods in Canada. The share runs as high as 30 percent in New Brunswick and 50 percent in British Columbia.

(iv) Regional Impact

There are more than 300 one-industry communities in Canada that derive their livelihood from logging and the related timber processing industry. There is clearly "no other game in town". In many other resource-based communities the forest sector plays a secondary but still important role. In addition, the sector acts as a stabilizing influence on rural population and contributes to farm income through such varied means as pulpwood and domestic fuel supply from farm woodlots. The regional distribution of forest sector employment and sales value is estimated as follows:

| | <u>Employment</u> <u>(thousands)</u> | <u>Sales Value</u> <u>(billion \$)</u> | <u>Value Added</u> <u>(percent)</u> |
|------------------|---|---|--|
| Atlantic | 26 | 1.9 | 31 |
| Quebec | 88 | 5.8 | 15 |
| Ontario | 79 | 5.7 | 7 |
| Prairies | 19 | 1.4 | 11 |
| British Columbia | 98 | 7.4 | 54 |
| | <u>310</u> | <u>22.4</u> | <u>-</u> |

As an employment generator among the primary resource sectors, the forest sector ranks first or second in 10 out of 16 economic regions in Atlantic Canada, in eight of Quebec's 10 economic regions and in all six of those of Ontario. In British Columbia the forest sector is first in eight regions and second in only two where mining and smelting dominate.

(v) Trade

Forest industry exports reached \$12.8 billion in 1980, or 17 percent of the total. Imports of forest products were \$1.0 billion, resulting in net earnings of foreign exchange of \$11.8 billion. This compares very favourably with other industries as shown for 1980:

| | <u>Exports</u> | <u>Imports</u> (billion \$) | <u>Balance</u> |
|--|----------------|--------------------------------|----------------|
| Forest products | 12.8 | 1.0 | 11.8 |
| Farm & food products excluding fish | 7.0 | 4.7 | 2.3 |
| Fish products | 1.2 | 0.1 | 1.1 |
| Iron, steel and non- ferrous metals | 12.3 | 6.1 | 6.2 |
| Coal | 0.9 | 0.8 | 0.1 |
| Crude petroleum | 2.9 | 6.9 | -4.0 |
| Transportation and auto- motive equipment | 13.3 | 15.9 | -2.6 |

(vi) Transportation

Forest products account for one-eighth of railway carloadings, or some 40 million tonnes. In addition, the industry purchases a considerable volume of chemicals, fuel, machinery and other items which are delivered by rail. This inbound and outbound traffic is carried at compensatory rates which contribute importantly to the revenues and overhead costs of the railway.

(vii) Capital Investment

New capital and repair expenditures in the forest sector are expected to exceed \$4.5 billion in 1981. The industry accounts for 20 percent of the total new investment in manufacturing, which underlines again the powerful linkages referred to in (ii) that discusses indirect employment.

(viii) Tax Revenues

The forest industry and its employees paid over \$3 billion in taxes and resource revenues in 1979, of which 43 percent was federal and 57 percent provincial. This sharing is decidedly more favourable to the federal government than in the case of petroleum and natural gas.

7. The direct economic contributions of the forest industry cited above are matched by other benefits which depend on the same forest land base. The forest resource is the backdrop of a multi-billion dollar recreation and tourism industry. The forest also moderates weather, regulates stream flow, minimizes soil erosion, protects fish and wildlife habitat, and is the home for many native people. Taken together, these economic, social and environmental benefits support the claim that forest land is Canada's most valuable natural resource.
8. It follows from the above evidence that a strengthened forest resource will benefit every Canadian, in this generation and in succeeding ones. This sector can produce additional tax revenue, employment opportunity, foreign exchange earnings, and regional economic activity. No other industrial sector has the potential to contribute more to economic development in the next two decades. In contrast, neglect of the resource will have negative impacts of equal or greater magnitude.

Major Issues

9. The most important issue facing the forest sector is timber supply. Local shortages of wood at a competitive cost have emerged in every province. In the past it was customary to harvest virgin timber and leave nature to replenish supply. In effect, we mined the virgin forests and gave too little thought to the future crop. Supporting evidence will be given later in the paper. Forestry is now in a critical transition stage where "mining" must give way to systematic forest renewal.

10. The other side of the coin is the demand for forest products. International markets are expected to be relatively favourable for our major forest commodities in the coming decades. While this is good news, there are constraints in the market place that will have to be dealt with if we are to take full advantage of the opportunities. Market opportunities obviously mean little if timber supply cannot be augmented.
11. A third major issue in the forest sector is the adequacy of research and development. R&D results have an important bearing on timber supply and market potential, and therefore on our competitive position in world markets. Neglect of science and technology is just as serious as neglect of regenerating cutover forests. R&D results will enable us to be more cost-effective in the use of scarce forest renewal funds.
12. The fourth issue is the manpower crisis that relates directly to each of the above. A pronounced shortage of research personnel is projected in forestry and forest products research, particularly at the Ph.D. and Master's levels. Professional foresters and woods labour are also expected to be in short supply.

Specific Constraints on Development

13. The Canadian forest sector has a development potential that is widely recognized. Our eventual performance will depend on how shrewdly we analyse constraints on development, and what strategies are adopted by governments, the private sector, universities, the work force and other participants. The major constraints are:
 - a) Funding of forest management is inadequate and the mechanisms for delivery can be improved.
 - b) Manpower shortages are a serious problem at all levels: scientific, technical, professional, trades, operational and woods labour.
 - c) Seed orchard and nursery capacity are lagging well behind requirements.
 - d) The resource information base is deficient for the task of accelerating forest renewal on a cost-effective basis.
 - e) Institutional handicaps persist in areas such as licensing of public land, income tax treatment of forestry, and contradictory land use priorities.
 - f) The knowledge base provided by research is considered unsatisfactory, relative to our competitors, in forestry, logging, processing, and new product development.
 - g) Protection programs are inadequate in the three principal areas: fire, insects and disease.
 - h) The commitment to forestry is still too narrowly based and is lacking in concern for future generations.
 - i) Rail transportation may become a bottleneck if the demands for moving agricultural and mining products force rationing of rail time and cars.
14. These constraints are dealt with in the next main section where the separate elements of strategy are discussed under markets, wood supply, R&D, manpower and other headings.

D. ELEMENTS OF STRATEGY

Theme and Rationale

15. The natural resources of Canada have been primary generators of income and employment throughout our history. The forest resource in particular has played a key role historically in our economic development, and in effect provided the early scaffolding for industrialization. Forestry still has the potential to contribute in a major way to national growth goals now being formulated for the economy. In short, the theme of this strategy is economic and social development. Social priorities can mesh well with this strategy. Examples are the employment of natives, students and new entrants to the labour force. Each of these groups will find expanded job opportunities in regeneration and timber stand improvement.
16. The forest sector strategy proposed herein is intended to mesh with federal priorities for economic development in the years ahead. As such, the strategy recognizes the desirability of an integrated approach to economic development that embraces the eight component priorities cited by the Minister of State for Economic Development: human resources, capital investment, market development, infrastructure, natural resources, technology, institutional framework, and energy. Action in each of these areas can contribute to forest industry viability and an improved climate for new investment.
17. The forest sector is an important element in the economic and social life of every province, and the policies recommended in this paper will impact similarly in a nation-wide manner. Every region will share in the benefits flowing from a strengthened forest resource base and the consequent expansion in manufacturing.
18. A basic premise is that a strategy for the forest sector can only be successfully implemented in concert with the provinces, industry and the trade unions. This will ensure a minimum of duplication of effort, the most cost-effective use of scarce funds, and avoidance of conflict in both policy formulation and program management. There is a need, however, to clarify the respective roles.
19. New subsidies for industry, such as the pulp mill modernization program, have not been identified at this time. Direct intervention by the federal government is not necessary in commercial marketing arrangements and distribution. However, there is still a significant federal role in the forest sector strategy, for example in (a) lessening trade barriers in international markets and promoting Canadian exports, (b) ensuring a positive economic and regulatory climate for new investment, (c) improving the resource data base, (d) maintaining forestry research and development at a level consistent with our international competition, (e) ensuring that the gap in scientific and professional manpower is closed, and (f) supporting provincial forest renewal programs where regional and transitional considerations may warrant, in order to ensure permanent viability of the resource, (g) provisions of national and international forestry statistics. The respective roles of the senior governments and the private sector are currently under discussion, especially where shared responsibility exists. Examples are the training of skilled manpower and R&D. Another critical area that must be addressed is improved fire protection.

Federal Forest Policy Historically

20. The provinces were assigned responsibility under the BNA Act for the management of Crown forests within provincial boundaries. However, in the four western provinces that joined later, their control was not assumed until 1930. The sale of timber and forest land became important revenue sources for provincial governments in the early days of confederation.

21. The federal government has carried the major share of the responsibility for forest research since it was first undertaken seriously in the 1920s. The Canadian Forestry Service now budgets \$44 million in eight separate research centres. In addition, the provinces and industry spend approximately \$20 million more.
22. Forest products research is now shared with industry. Forintek, formerly the Forest Products Laboratories of the Department of the Environment (DOE), is now a private corporation which conducts research on solid wood products, with approximately half of its funding from the federal government. The Forest Engineering Research Institute of Canada (FERIC) conducts a program of logging research, and half of this is funded federally. The federal payments to Forintek and FERIC now total \$6 million annually. The Pulp and Paper Research Institute of Canada is now funded entirely by the industry, but is located in a building provided by the federal government.
23. Apart from R&D, various forest management functions have been funded over time by the federal government. In the early decades of confederation, a large share of forest fire suppression costs were paid from federal funds.
24. In 1949, the Canadian Forestry Act authorized federal authorities to enter into assistance agreements with the provinces. This led to the "composite forestry agreements" in the period 1951-67, under which the federal government shared in the cost of inventories, reforestation, fire protection, access roads and stand improvements. Several special agreements were also initiated in that period, including spraying programs for spruce budworm and employment stimulation. This was a productive period in forestry relations with a number of solid accomplishments. Federal expenditures in that period were equivalent to about \$225 million in 1981 dollars.
25. In the years 1967-74, forest sector funding was conducted under ARDA (Agricultural and Rural Development Act) and FRED (Fund for Rural Economic Development) and other arrangements. In 1969 Department of Regional Economic Expansion (DREE) began to coordinate an array of federal assistance programs, but the forestry sub-agreements did not begin until 1974. The last two of these were signed in early 1981 and will not expire until 1985. Federal expenditures will be approximately \$65-70 million in 1981-82. The total federal share of DREE forestry agreements signed since 1974 will be \$526 million.
26. The federal government has not intervened in the marketing functions through price stabilization, marketing boards or transportation subsidies. Federal activity on forest products has been limited to trade promotion and tariff policy. For example, there is a three-way agreement with British Columbia and the Council of Forest Industries of B.C., under which a cooperative market development program has been implemented for solid wood products in selected overseas countries. The third five-year agreement raised the total federal commitment to about \$10 million. Following a joint review of the problems and opportunities facing the pulp and paper industry during the early 1970's, a federal/provincial Forest Industries Development Committee (FIDC) was established in 1974 to facilitate and encourage an exchange of views between both levels of government on issues of mutual concern in the forest products sector.
27. A pulp and paper mill modernization program has been jointly funded with the provinces and industry, beginning in 1979. The federal commitment was capped at \$279 million. This program has stimulated provincial grants of \$300 million and about \$3 billion so far in private sector investment. The leverage exerted by federal funds was better than ten to one. The projects were specifically designed for pollution abatement and energy conservation and increases in the efficiency of processing. Additional funds have been spent on forest projects under the Regional

Development Incentives Act, with the payments again being made directly to companies.

28. The federal government is responsible for the forest lands in the Yukon and Northwest Territories, but management of those lands has been confined largely to minimum fire suppression. A substantial increase in fire fighting capability has been agreed to recently, following disastrous losses in 1979 and 1980. Forests on Indian reserves and lands administered by the Department of National Defense (DND) are under federal jurisdiction but these have not been managed intensively.
29. This short account of direct federal involvement in the forest sector indicates a longstanding commitment to the forest resource and its related manufacturing sector. The payoff has been directly in line with federal responsibilities and priorities such as stable growth in employment, foreign exchange earnings, regional economic development, pollution abatement and resource conservation.

Market Opportunities

30. The forest sector strategy proposed in this paper is based on a relatively strong market outlook prepared by a world-wide Working Group including the forest industry, governments, universities and trade associations. The exercise was fully supported by the UN Food and Agriculture Organization (FAO) Forestry Department and represents the best market consensus available for planning purposes. This group projected growth in world consumption of forest products during the years 1980-2000. Paper and paperboard are expected to experience the most rapid growth among the three major categories in this 20-year period:

| | |
|----------------------|------------|
| Paper and paperboard | 75 percent |
| Wood-based panels | 55 percent |
| Lumber | 25 percent |

31. Canada's forest industry has always relied on exports for the bulk of its sales. We now account for one quarter of the total world trade in manufactured forest products. Exports of \$12.8 billion in 1980 were approximately double those of Sweden, our nearest competitor, and about four times as much as those of Russia. Canada's share will decline if the strategy outlined herein is not implemented.
32. Strong growth in consumption is expected in bleached kraft grades of wood pulp. Canadian exports of this product were nearly \$4 billion in 1980, and we accounted for nearly half of total world exports. Demand is expected to double by the year 2000.
33. Canada's exports of newsprint are also nearing \$4 billion annually and in this case we account for two thirds of world trade. Demand is projected to grow by about 55 percent between 1980 and 2000. The question is often raised whether electronic transmission of news will erode traditional newsprint markets. The FAO and Working Group experts considered this possibility carefully and concluded that such market erosion is unlikely to be significant within the time frame considered here.
34. Softwood lumber exports amounted to over \$3 billion, even with the depressed prices which prevailed in 1980. Canada's share of this trade is around 40 percent. World consumption of softwood lumber is unlikely to grow by more than 20-25 percent before the year 2000.
35. Other wood and paper products make up only 15 percent of the total exported from Canada. However, this category includes further manufactured products and ways to increase international market penetration are being examined constantly.

36. The long-term competitive strength of the Canadian forest industry has been based in large part on the properties of our softwood timber species. But there are other favourable factors as well, most of which result from decades of painstaking effort. These factors include stable work force, advanced technology, efficient transportation and distribution, low energy costs and a reputation for quality products.
37. The short-term situation is influenced more importantly by exchange rate fluctuations and relative rates of cost inflation. The low value of the Canadian dollar today is responsible for a major share of current profits. However, Canadian experience with exchange rate volatility suggests that it is only a matter of time until the present discount lessens appreciably. There is also a nagging concern over the prospect that the rate of inflation in Canada will exceed the U.S. rate and thereby weaken our competitive position.
38. In spite of this uncertainty, the medium and longer term outlook is generally regarded with some optimism by the Canadian producer of forest products. The principal reason is that world timber supplies are increasingly strained, especially in those long fibre softwood species which are most in demand. Neglect of forest management in the northern countries is now beginning to raise questions about the future expansion potential. Meanwhile, softwood plantations in the southern hemisphere have not done nearly as well as expected and tropical hardwood forests are being denuded at alarming rates.
39. In short, the emerging supply-demand balances for timber point clearly to higher real prices. When these are combined with the potential for increased volume, and with improvements in value-added, the forest sector market opportunities are seen to be very attractive for Canadian producers. Their selling value of shipments and accompanying export earnings could be doubled by the year 2000.

Market Strategy

40. An appropriate market strategy will deal with various constraints which are known to inhibit sales, especially in our export trade. The principal ones are listed below:
 - a) tariff and non-tariff barriers
 - b) lack of market diversification geographically
 - c) need for new product development
 - d) neglect of the hardwood timber resource
 - e) difficulties in trading with centrally planned economies.
41. Some important reductions in trade barriers were achieved in the recently concluded Multilateral Trade Negotiations. The next priority objectives for Canada will deal with a number of issues, such as the Japanese tariff of 10 percent on sawn "whitewood" lumber, the European Economic Community (EEC) tariff on planed lumber, and potential problems regarding access for Canadian newsprint to the EEC market. Over the longer term we shall need to consider the reduction of trade barriers on a variety of further manufactured products. This is essential to increase the level of processing in exports of Canadian forest products.
42. The present distribution of forest products trade shows that three countries account for 79 percent of our exports:

| | |
|---------------------|------------|
| United States | 63 percent |
| Japan | 9 |
| United Kingdom | 7 |
| All Other Countries | 21 |

A broader distribution pattern would be to Canada's advantage, especially in times when the U.S. market for lumber or newsprint is depressed. Heavy reliance on a single market also leaves the Canadian producers very exposed to protectionist pressures which emerge in situations like we have today. Softwood lumber producers in the U.S. are beginning to object once again to Canada's 30 percent share of their market.

43. New product development requires constant effort if Canada is to meet competition from substitute materials and adjust to a changing raw material position. One example of this is the pioneering work in Canada on new wood-based panels. These have found ready acceptance in North American housing and industrial markets. Attention needs to be concentrated on under-utilized hardwood species, such as poplar. These are destined to play a much larger role in paper as well as in solid wood products. A study is now underway on the potential for expanding poplar use, focussing on the application of recent developments in pulp and paper making technology as well as marketing of the resulting products. These examples illustrate the kind of innovation which must have further support if Canada is to take full advantage of its resource base.
44. Trading with centrally planned economies presents problems which the private sector is not always equipped to deal with. Early identification of markets, export credit arrangements and other types of assistance could be expanded. This would have been especially welcome in the case of China, where Canadian forest product sales have been lagging well behind those from the United States.
45. Canadian forest-based companies have evolved a highly efficient sales and distribution system which provides the economies of large scale operation and the financial resources which enable even the smaller firms to cope with fluctuating markets as well as or better than their competitors. The industry welcomes the traditional promotion efforts of the Trade Commissioner Service.
46. Industry, Trade and Commerce (ITC) is preparing country-specific export strategies that take into account the considerations previously outlined.

Wood Supply Situation

47. Given the market outlook for forest products and Canada's competitive capability as described above, the crucial issue is wood supply. Analysis of the resource base will quickly show the urgency of improved resource management and provide the context for a forest resource strategy.
48. The volume of timber that can be harvested annually on a perpetual basis is known as the annual allowable cut or AAC. The estimated AAC for a given area of land is based on assumptions regarding annual tree growth, losses to insects and other natural causes, the share of standing crop which is merchantable, and other variables. The AAC may be raised if the levels of forest renewal, protection and utilization are increased, and it may be lowered if the assumed standards are not met, or if timber land is withdrawn from industrial use.
49. The AACs for Canada's softwood and hardwood species groups have been reduced dramatically in recent months from the levels that were accepted five years earlier. The reduction is about 20 percent on average for softwoods. The main factors responsible for lowering the AAC are past neglect of forest renewal and heavier losses than expected from fire and insects, the establishment of parks and wilderness areas, and the application of environmental guidelines to logging. The latter restricts logging of trees adjacent to streams and lakes as well as on steeper slopes or higher elevations. Other reasons for exaggerated estimates of AACs are also apparent. There was

failure to distinguish between the physical volume of timber in the forest on the one hand and its quality and cost on the other. It is now recognized that forward planning, by industry and government alike, was very deficient.

50. The reduction of the AAC for hardwoods is closer to 35 percent and is a result of the realization that much of the hardwood forest cannot be harvested and processed at a profit. This became clear with better inventory information and with industry experience in using hardwood timber stands.
51. The softwood species account for 94 percent of the current roundwood harvest and represent the most critical supply problems. A comparison of the AAC and the 1979/80 harvest level suggests initially that a modest reserve is available for expansion:

| | |
|---------------------|------------------------------|
| Softwood | 173.8 million m ³ |
| Harvest in 1979/80 | <u>147.5</u> |
| Theoretical reserve | <u>26.3</u> |

52. A more systematic analysis by region quickly reveals that softwood shortages are pervasive, especially for sawlogs and veneer logs. Any softwood reserve which does exist on paper is generally characterized by remoteness, high logging costs, or less attractive grades and species. The situation in each province is summarized below.
53. Newfoundland has been hit hard by the spruce budworm and this, along with historic factors such as the imbalance in age class structure of the forest, could result in a reduction of the AAC by as much as 20 percent, or a figure well below the industry's current requirements. Budworm control was conducted on a large scale in 1978 and then chemical spraying was withheld in 1979 and 1980. A Royal Commission recommended that spraying commence again in 1981, but severe damage had already been done. The three paper mills at Grand Falls, Cornerbrook and Stephenville may have real difficulty securing an economic wood supply that is sufficient to sustain full capacity operations indefinitely. There is a limited amount of pulpwood in Labrador but it is very expensive to deliver on the Island. An integrated program of protection, improved utilization and massive silvicultural investment, especially reforestation, is required to correct the situation and ensure an adequate wood supply for the mills.
54. Nova Scotia has also been hit by the budworm and has experienced catastrophic losses of softwood timber, especially in Cape Breton. Protection from insects is confined to limited use of biological controls. The provincial government and Nova Scotia Forest Industries Ltd. have been studying the feasibility of using hardwoods and a different product mix to ensure the survival of the pulp and paper mill at Port Hawkesbury. The harvest is running about 15 percent above the estimated AAC.
55. New Brunswick's softwood timber harvest is also about 15 percent above the AAC. In this case a reduction in the AAC has already been calculated, prompted by a realistic assessment of budworm losses and forest renewal performance. The province has concluded that a major forestry effort will have to be mounted immediately. Existing forest producers are faced with imminent shortages of quality timber, especially in the Chatham and Bathurst region. In spite of a complete reallocation of Crown timber, the available supply appears to fall short of full capacity operations.
56. Prince Edward Island is analysing a forest resource that covers 70 percent of the land. Overuse and insect damage have severely degraded the timber. The province has concluded that the sawlog supply is heavily overcommitted. While the tentative AAC estimates indicate that managed forests will support harvest above the current

level, implementation of intensive forestry is constrained by a shortage of funds and by the fact that 16,000 small woodlot owners control over 90 percent of the resource. The majority of these lack adequate incentives to engage in forest renewal. The province is developing new forestry initiatives to cope with the timber supply problem.

57. Quebec's softwood AAC is about 25 percent above the present harvest, indicating on paper a possible reserve for expansion. However, two thirds of this hypothetical reserve is in the largely uninhabited forests lying north of a line drawn through Port Cartier (site of the failed Rayonier mill), and LaSarre on the Ontario border. Companies that are looking for expansion sites generally consider the more remote areas to be economically inaccessible at this time. Local shortages of wood are known to exist, especially for sawlogs. The Abitibi region in the northwest, for example, can expect problems in the next decade. It was this general concern with timber availability that led the province several years ago to adopt a policy of retrocession of timber licenses and new allocation arrangements.
58. Ontario's situation is similar to that of Quebec. The AAC for softwood is presently calculated to be above the current harvest. However, a reduction of the AAC has already been made and others are likely, in recognition of budworm and fire losses, withdrawals of timber land for single purpose use, and failure to adequately regenerate a large proportion of forest lands cutover during past decades. In addition the AAC was deliberately set above the long run sustainable level in order to accelerate the removal of over-mature forests before decay became pronounced. The time has now arrived for setting realistic AACs for the next two decades. The Hearst and Chapleau areas are among those which are in the greatest jeopardy. Shortages will become more widespread in the 1980s unless forest renewal performance improves dramatically. The new Forest Management Agreements being negotiated are the main provincial response to pending timber deficits. These agreements impose rigorous requirements on the industry.
59. Manitoba has large areas of uncommitted softwood timber, but remoteness, low volume per hectare, and high cost of delivery to mills limit their value. Timber supplies are very tight in the southeast. The 1980 forest fires have placed Porcupine Hills forest operators in jeopardy. Any further losses in the area from The Pas to Dauphin will lead to a supply crisis. An important constraint is lack of forest access roads. A new provincial forest policy is being developed.
60. Saskatchewan's softwood timber harvest is very close to the AAC, which has recently been reduced. There seems to be little expansion potential. On the contrary, it appears that sawmills and plywood capacity were extended beyond the sustainable limits of supply. Serious forest fires have worsened the situation. Forestry operations in the Carrot River area and near the town of Hudson Bay are among the more vulnerable.
61. Alberta has by far the most promising outlook in terms of expansion potential, with one new forest products complex under construction and considerable interest in a recently advertised license area. One concern is the effect of environmental regulations and reserves, particularly in the foothills southwest of Calgary. Some sawmill capacity seems to be threatened. The mountain pine beetle has destroyed the majority of the softwood timber in Waterton Lakes Park and is moving into the area to the north, posing an ominous threat to timber, recreation and other forest resources along the east slope of the Rockies.
62. British Columbia published an exhaustive forest and range resource analysis in 1980. It concluded that serious wood supply problems lie

ahead. In the long run, after the virgin timber is exhausted, "the provincial supply will be approximately two thirds of the present harvest if forest management programs are continued at past levels". In the short run, a falldown in local supplies is projected within 5-10 years in seven out of eight administrative regions. New AACs have been calculated for most timber supply areas, and present indications are that the total AAC for the province will be below the current harvest. The principal causes are withdrawals of timber land from commercial use, neglect of forest renewal, and severe losses to insects such as the mountain pine beetle. While the AAC and timber harvest are reported to be in balance for the larger provincial forests, local shortages still exist in terms of quality, species mix and cost. Another problem is the uneven management on privately owned forests and old temporary tenures outside the Tree Farm Licenses. The overcommitment in some of these cases could lead to curtailment of some sawmill operations. Examples of threatened communities are Creston and Cranbrook in the southeast and the Terrace-Houston area in the northwest, and along the south coast.

63. The Yukon and Northwest Territories have large areas of forest land but the exploitation to date has been negligible. Timber which is largely inaccessible, physically and economically, does not have an AAC in the accepted sense. The prospects for forest industry investments in this area will depend on improved access, higher product prices and the development of larger consuming markets in the region.
64. The evidence presented here shows that only four provinces have uncommitted softwood timber reserves, and that these reserves are largely uneconomic because of the high costs associated with remoteness, low volume per hectare and other factors. Two provinces appear to be approximately in balance and the remaining four are in a deficit position.
65. Another important factor in timber supply analysis is that averages for a large region tend to cloak severe local problems. For example, a surplus of low-quality fir pulpwood is of no value to a sawmill designed for large diameter pine and spruce logs. And a surplus of timber may be too costly to move to a deficit area, even if the specifications match perfectly.
66. The hardwood resource contrasts sharply with the softwood situation described above. Hardwoods account for only 20 percent of Canada's timber volume and AAC. They are less evenly distributed, with relatively small volumes in British Columbia and some of the Atlantic provinces. Finally, there is a marked surplus of hardwoods, with only one quarter of the AAC being harvested at the present time.
67. Hardwood expansion potential is limited almost exclusively to poplar and aspen types that are found mainly in publicly owned forests in central Canada and the Prairie provinces. These account for well over half of the total hardwood supply, but are relatively unattractive commercially because of their quality and product suitability.
68. The higher value hardwood species, maple, ash, birch and walnut have been severely overcut. Canada is now importing hardwood logs, lumber and veneer for furniture and other industries.
69. The majority of these high-value hardwoods are located on private land in the Maritimes and the southern portions of Quebec and Ontario. Even today, serious forest renewal is practically non-existent in most hardwood forests on public and private land. Interest in managing the hardwood resource is lagging at least a decade behind that for softwoods.
70. In short, the Canadian forest has fallen victim to myths and slogans,

such as "sustained yield" and "renewable resource", which have done more to impede than to encourage management.

Myth No. 1: Canada's timber supply is inexhaustible.

Myth No. 2: Our forests have been managed on a sustained yield basis.

Myth No. 3: A renewable resource is renewable promptly and automatically.

Public support for forest management will only be forthcoming when these myths are exposed.

71. The evidence is unmistakable. The limits are in sight for premium softwood sawlogs in many locations and supplies of larger, higher quality hardwood logs have become very scarce. Pulpwood shortages are emerging in local communities across the country. Only a fraction of our forests are being managed for sustained production, even today. And in most cases the timber resource is renewable, both promptly and adequately, only if action is taken following harvest or natural calamity.
72. This description of Canada's timber supply may sound exaggerated to some, but it has been verified by recent enquiries in each of the provinces. To others it may convey a message of pessimism and hopelessness, although this is certainly not intended. The existing industry can be stabilized and indeed launched on a new period of expansion, provided that the challenge of forestry is understood and accepted. What is needed now is action to harness the expertise and the necessary financial resources.

Means of Augmenting Wood Supply

73. There are four principal means of augmenting the wood supply:
 - a) closer utilization, which means using a greater share of the fibre from currently occupied forests, and developing processes to use the fibre more efficiently in the mills
 - b) extension of harvesting to more remote and higher cost stands
 - c) reducing losses from fire, insects and disease
 - d) increasing the productivity of presently occupied forests, through more intensive management.
74. Closer utilization could increase softwood fibre recovery by 10-20 per cent, assuming the removal of logging residues and harvesting of stands which are now bypassed because of low volume per hectare, small size of trees or less desirable species mix. Unfortunately this additional material will include few sawlogs or veneer logs. Moreover, it will be more costly to produce as well as lower in quality and will call for technical advances in processing.
75. Extension of harvesting to more remote timber is still possible in some provinces, but it usually means opening up areas not now considered to be economically accessible. The private sector will experience much higher capital and operating costs in remote regions. In addition, the new communities and associated infrastructure will require heavy commitments of social capital, a burden carried largely by senior governments. The potential from expansion of this nature is probably less than a 10 percent increment in timber supply, which will generally be less attractive in terms of size and grade, as well as more costly. This option should not be viewed as an excuse to perpetuate the neglect of management in presently occupied forests.

76. Improved protection can produce quite remarkable results, bearing in mind first that insects and disease tend to invade mature timber which is scheduled for harvest in the near future. For example, the forest industry in New Brunswick would be only one third its present size if spruce budworm control programs had not been carried out over the past 30 years. A suggested goal is to reduce the natural losses on average by at least 15 percent, which would add nearly the equivalent amount to the AAC.
77. Intensive forest management promises much more substantial gains than the other three options and is the only long-term answer to stable growth in the forest sector. Experience in Canada and in similar northern forests elsewhere has demonstrated that gains of 50-100 percent or more can be achieved in volume. Additional benefits include timber of lower cost and higher quality than can be secured through closer utilization or remote stands. The results of intensive forestry accrue through a combination of site preparation, use of genetically superior planting stock, prompt planting after harvest or natural loss, suppression of competing vegetation immediately after planting, thinning and fertilization.
78. Before a decision is made to push back the frontier in some remote area, it would be prudent to consider first the associated public and private costs, and then compare what the equivalent expenditure would yield if directed to intensive management on lands adjacent to the mills. Today's high energy and transportation costs make it imperative that we begin to examine benefits and costs in this way.
79. Intensive management means that higher quality timber can be produced in a shorter time. It also means lower logging and handling costs to the extent that intensive treatments are applied near manufacturing plants and on less rugged terrain. The longer run gains will include higher volumes per hectare, more uniform tree size at maturity, and less decay, waste and breakage. Each of these will tend to lower costs of delivered wood and thereby contribute to our competitive capability in export markets.
80. The additional timber can often be made available as soon as management is accelerated. Where an adequate volume of mature timber is still available in a timber supply area, intensive forestry gives rise to the "allowable cut effect", defined as an increase in the permissible harvest of mature timber resulting from anticipated higher yields from managed stands. Simply stated, you can harvest more if you grow more. This concept of balancing growth and cut is acceptable to the forestry profession and is embedded in the policies of provincial land managers. However, the mature timber may be so badly depleted in a given area that no increase in the AAC is possible for two or three decades. In these cases the issue is survival rather than growth.

Supply Strategy

81. The urgency of strengthening the resource base has been discussed with the provinces, primarily through the Canadian Council of Resource and Environment Ministers (CCREM). The target endorsed by CCREM in early 1980 was a harvest level of 210 million m³ by the year 2000, or approximately 40 percent above the expected harvest in 1981. This involves an average annual increase of only 1.8 percent, compared with the FAO projection of 2.1 percent for increase in world consumption of industrial roundwood during the same period.
82. Meeting this target will require much more than just closing the regeneration gap. It will also require a program of timber stand improvement and efforts to rehabilitate some of the backlog of

neglected cutover forest. At present the industry harvests about 800,000 ha annually, of which 200,000 ha are artificially planted or seeded. Some 200,000-300,000 ha regenerate reasonably well on their own, and the remaining area lies idle for a time or reverts indefinitely to non-commercial weed trees and scrub.

83. Canada's reforestation effort should aim at artificial regeneration wherever nature does not renew the forest promptly and the productivity of the land warrants the expenditure. It should also set a goal of reducing that portion of the backlog of neglected land which is on productive sites near existing communities. This effort will mean raising the annual reforestation program from 200,000 ha to 700,000 ha.
84. Silvicultural treatments such as weeding, juvenile spacing and fertilizing now cover about 100,000 ha annually. Consideration should be given to raising this to 400,000 ha. Weed control is particularly important to survival of plantations on better sites.
85. The cost of existing forest renewal programs of this kind will be about \$230 million in 1981. The additional costs will be estimated in concert with the provinces and industry. The new funds will not all be needed immediately because it takes time to develop seed orchards and nurseries, and to provide the logistical support for an accelerated effort.
86. The annual losses of merchantable wood from fire, insects and disease are estimated at 100 million m³, or nearly two thirds of the volume harvested. The year 1980 was the worst fire season in 50 years. The area burned was five times greater than that harvested. Losses in 1981 in Alberta will exceed one million ha. A reasonable target for reduction of the average annual loss would be 15 percent, or an amount equivalent to the harvest in the four Atlantic provinces. Total protection costs paid by industry and governments will also be about \$230 million in 1981. There is a strong possibility that research will lead to more effective means of protection with lower costs, and this may well affect costs of expanded protection programs.
87. Closer utilization is a necessary part of resource strategy, especially where deficits are emerging and there is a deficiency of mature timber in the same vicinity or in more remote, unoccupied stands. The costs of incremental supply in this case fall on the operating companies.
88. Greater attention to small private woodlots might also be considered. Separate measures would have to be designed in this case. Although only 8 percent of the forests within provincial boundaries are privately owned, these forests account for the majority of the resource in some regions. This is true of the Maritimes and southern Ontario and Quebec. There is an opportunity to augment earnings of farmers through the sale of additional pulpwood and domestic fuel.
89. Adoption of the foregoing measures would permit increases in the sustainable timber supply by the mid-1990s of the following magnitudes:

| | Million m ³ |
|--------------------|------------------------|
| Forest renewal | 30 |
| Protection | 15 |
| Closer utilization | 10 |
| Total | <u>55</u> |

90. The allocation of funding responsibilities is vigorously debated and no simple formula can be expected. The present sharing of costs will throw some light on the matter. In 1979, the distribution of costs among the three main participants for forest renewal and protection was:

Forest Renewal

| | <u>Million \$</u> | <u>Percent</u> |
|-----------|-------------------|----------------|
| Provinces | 118.9 | 66.7 |
| Federal | 37.3 | 20.9 |
| Industry | 22.1 | 12.4 |
| | <u>178.3</u> | <u>100.0</u> |

Protection

| | <u>Million \$</u> | <u>Percent</u> |
|-----------|-------------------|----------------|
| Provinces | 126.1 | 76.8 |
| Federal | 17.0 | 10.4 |
| Industry | 21.1 | 12.8 |
| | <u>164.2</u> | <u>100.0</u> |

91. The industry share of forest protection and renewal is the smallest. It argues that its first responsibility is to maintain manufacturing facilities in top condition. Industry also holds that since most of the resource is publicly owned, the provinces should pay the forestry bills out of industry taxes and timber sale charges. Several of the provinces agree with this view and are not requiring the industry to contribute directly to forest renewal. Nevertheless, it is fair to say that industry benefits greatly from use of the provincial resource and that a strengthened resource is very much in their interests. It is also true that they have contributed to the present supply problems, both by failure to plan for the long-term and by too little forest renewal in past decades. There are important exceptions, of course, to the last statement. Some companies have performed superbly.
92. The provincial share of forest renewal and protection costs is much larger than the federal share for Canada as a whole. However, in the Atlantic provinces the DREE agreements provide for payment of the majority of forest renewal. Ability to pay has been an important determinant in cost sharing arrangements. Federal responsibilities with respect to employment creation, regional disparity and national economic concerns such as the balance of payments have influenced the allocation of forestry funds and others over time. It is clear that the federal stake in forestry is different in some respects from the provincial one.
93. Better forest management will cost more. On the other side of the ledger are the expected benefits from the increment in available timber volume, that together with the anticipated increases in both real price and value added, could be expected to yield the following dividends for the Canadian economy annually:
 - a) Employment opportunity for 75-100,000 people in forest renewal, logging and manufacturing
 - b) Increased sales of \$22 billion, or double the present.
 - c) Additional exports worth \$12 billion, also double the present.

- d) Consequent benefits in related supply and service industry.
 - e) Increased tax revenue in excess of \$1 billion.
94. The net revenue picture needs to be underscored. An expanding industry with a healthy resource base would generate additional tax revenue to senior governments which would be several times the additional forestry costs. In contrast, further neglect of forestry would quickly lead to widespread economic dislocation, and bills of a different kind would fall due.
95. The regional impact of the strategy would be pervasive because of the widespread importance of the sector. In the Maritimes, the first effect would be to stabilize the wood supply of the existing industry. Eventually increases in yield would allow increases in mill production. Increases in production should be possible much sooner in parts of Quebec and northern Ontario. This is particularly true of the Lakehead region where much productive forest land was not regenerated. The Prairie provinces would benefit materially from development of technology to use poplar. The greatest long term impact, however, would probably be in British Columbia, which currently produces half of Canada's timber. The projected new employment would be in approximately the same ratios regionally as shown in Section 6(iv).

Research and Development Needs

96. Research and development is an essential component of the resource and marketing strategies which have already been examined. They are separated here for presentation purposes and to underline the importance of research at this particular time.
97. As indicated previously, the historic pattern has been that the forest industry exploited our natural forest which was provided virtually cost-free. During the early 1960s it became apparent that the time was rapidly approaching when we would have to pay the cost to grow our own. This fact was highlighted in the Montebello Forestry Conference in 1966.
98. Growing your own trees requires a vastly expanded body of knowledge. Protection research requirements also expand as hundreds of communities are born in forested regions, and as the resource increases greatly in value. Similarly, harvesting and processing technology must be kept up to date in a highly competitive world. New product development must also keep pace.
99. This research challenge was accepted initially by the federal government and the Canadian Forestry Service (CFS) budget was expanded substantially during the 1950s and 1960s. Then in the late 1960s these research budgets were severely curtailed in successive periods of fiscal restraint. Total expenditures on forest related research have declined since 1968 by 40 percent in constant dollar terms. The person years available to the principal research agency, the CFS, have decreased by more than 50 percent.
100. This major decline in research capability came at the very time when R&D needs were obviously increasing. Unfortunately the provinces and industry picked up only a small part of the slack. The result is that Canadians now spend less than 0.7 percent of the forest products sales dollar on R&D, compared with 1.5 percent in the U.S. We also lag behind our competitors in Scandinavia, Japan and New Zealand. Expanded research is a necessary condition to expanding export sales.
101. The payoff from R&D is rarely known in advance but numerous examples could be given where the returns have been dramatic in the past. Since 1952 the CFS has spent about \$50 million on spruce budworm research. The results have enabled control programs that in

New Brunswick alone have allowed a doubling of the industry's productive capacity and an increase in the value of sales from \$225 million (1980 dollars) in 1961 to \$1.2 billion in 1980. Another example is the spending of less than \$5 million developing a forest fire hazard rating system which now results in annual savings of at least \$20 million in fire control. The European spruce sawfly threat was potentially as serious as the budworm. CFS research costing less than \$100,000 eliminated the sawfly problem.

102. The future of forestry research holds equal promise. Genetically improved seed and controlled breeding can lead to productivity gains of 50-100 percent. Improvements in planting and stand tending techniques could save hundreds of millions in forest renewal expenditures over the next 20 years, a welcome prospect when funds are scarce.
103. Ongoing examination of research requirements and priorities may well lead to changes in the allocation of funding responsibilities among governments and industry. The present sharing of costs is shown in the next table which is taken from the 1979 Solandt report on forest sector R&D.

| | <u>Million \$</u> | <u>Percent</u> |
|----------------------------------|-------------------|----------------|
| Canadian Forestry Service | 45.6 | |
| Other federal agencies | 7.9 | 38 |
| Provinces | 19.7 | |
| Provincial research agencies | 5.7 | 18 |
| Industrial research corporations | 20.8 | |
| Major companies | 23.0 | 39 |
| Industry suppliers | 11.8 | |
| Universities | 7.4 | 5 |
| | <u>\$ 141.9</u> | <u>100</u> |

104. The foregoing schedule shows that the private sector carries 39 percent of the total. Industry efforts are principally in the field of new products, processing and logging research. The provinces are involved mainly in forestry research although a number of them support FORINTEK. The federal government still carries the largest share of forestry research, with emphasis on forest management and protection.
105. A national strategy for research related to forestry might well include the following elements:
 - (1) Clarify the level of support for research required in the forest sector.
 - (2) Conclusion of federal/provincial agreements to clarify respective responsibilities related to research
 - (3) Better coordination of the national effort to set priorities and to prevent unnecessary duplication of effort
 - (4) Strengthening of the forestry research capability within the universities
 - (5) Greater support for technology transfer.
106. Federal and provincial officials have held preliminary discussions along these lines. In research, it would seem reasonable that the federal government take primary responsibility for (1) research issues that transcend provincial boundaries, (2) research that is long term or basic in nature, or requires expertise of a rare sort that provinces cannot be expected to maintain, and (3) research to provide knowledge needed by

the federal government. The provinces would become increasingly responsible for R&D to solve immediate and short term problems in direct support of their operations. Industry too should become increasingly involved in development and application of research within their own operations, as well as maintaining major responsibility for forest products research.

107. Priority for increased research effort might be given to items such as:
 - (1) Forest production: techniques of reforestation and intensive stand management
 - (2) Forest protection: integrated pest management to reduce reliance on chemical pesticides; studies of fire behaviour and development of forest fire management systems; determination of the impact of acid rain
 - (3) Basic research: biotechnology; genetic engineering and tree breeding; tree physiology and ecosystem functioning; soil chemistry; the role of Canadian forests in maintaining atmospheric CO₂ balance.
 - (4) Harvesting and forest products: greater support for extramural research
 - (5) Technology transfer: close cooperation with the industry, provinces, and universities, and international organizations.

Human Resource Needs

108. An acute shortage of skilled manpower is already evident and it will worsen markedly as forest renewal and research efforts are expanded. The manpower bottleneck is just as serious as the scarcity of funds.
109. The manpower requirements extend along the entire spectrum from research to woods labour. The tabulation below outlines the projected needs for additional professional manpower during the next decade:

| | B.Sc.F. | Forestry Post Graduates | Other Specialties |
|---------------------------|------------------|-------------------------------|----------------------|
| | <u>Graduates</u> | <u>Graduates</u> | |
| Forest management | 5500 | - | - |
| Back-up support | 2500 | 800 | - |
| R&D - Forestry | - | 450 | 300 |
| - Wood science | - | 180 | 720 |
| Operations - Wood Science | - | 100 | - |
| | <u>8000</u> | <u>1530</u> | <u>1020</u> |

110. Approximately 800 graduates and 150 postgraduates in forestry would be needed annually for the next 10 years. Without this expertise, we shall be unable to educate professionals, meet research needs, or apply advanced technology in the sector. Canada's six forestry schools must train most of these people. At present they are graduating about 335 B.Sc.F. students annually and about 70 with postgraduate degrees. Roughly 20 percent of the postgraduates are foreign students and most return to their homeland.
111. The forestry schools will not be able to train this manpower without additional support. They suffer from a lack of: (1) adequate scientific capability; (2) well equipped laboratory space; (3) adequate research support in the form of technicians, graduate students and postdoctoral fellows; (4) faculty depth to allow specialization; (5) adequate research funding; and (6) specialization among schools.

112. Not all graduate training and research in forestry is conducted at the forestry schools. Many specialists in subjects such as plant physiology, entomology, genetics, biochemistry, business and commerce, engineering, economics and so on get their training in other departments. These departments must be considered in developing recommendations for improving postgraduate training in forestry.
113. Development of a strong faculty depends on the existence of a strong program in graduate training and research. Helping the forestry schools to develop greater capability in these areas would in turn strengthen their undergraduate programs. Consideration might be given to: (1) making available more scholarships, postdoctoral fellowships and research associates; (2) increasing block grants to the forestry schools; (3) increasing federal hiring of forestry students during the summer to expose them to research early in their careers; (4) filling CFS vacancies at the bachelor level and sending staff back to school for advanced training; (5) greater use of federal scientists to help in teaching and research direction, and (6) greater funding of forestry related research in the university community as a whole. Finally, the onus should not be on the federal government only. The options mentioned above are equally open to the provinces and industry.
114. The supply of forestry labour is increasingly tight, as shown by high turnover rates and the difficulty in recruiting workers in more isolated locations. Manpower planning is almost totally lacking. While this situation prevails, forestry operations will continue to suffer from relatively low productivity. A manpower action plan, in consultation with trade unions, industry and the provinces might be developed.
115. Employment opportunities totalling 75,000-100,000 might be anticipated if the forest sector strategy is implemented. As many as 20,000 of these jobs would be in forest regeneration and stand tending which draw heavily on native people, university students and new entrants to the labour force. These are categories that suffer heavily when jobs are scarce.
116. Native employment in forestry is now thought to be around 6,000 and these jobs are involved principally in logging and forest renewal, and to a lesser extent in manufacturing. This number could be doubled. The introduction of intensive forestry on Indian reserves would contribute to new opportunities of this kind.

Other Components

Resource Data Base

117. Under the BNA and Statistics Acts, the federal government has responsibility for national forestry statistics. At present, Canada does not have adequate national statistics for timber supply, natural depletion, rates of growth and yield, or the long term potential of the forests. We do know that shortages of timber are emerging, but more detailed data are essential to develop a policy, manage the resource, and develop and evaluate the ensuing programs.
118. At a federal/provincial meeting in 1976, it was agreed that the CFS should take the lead in developing a national forestry statistics program and in December 1979, the federal government confirmed this as a federal role. The CFS has since established a program to satisfy federal data needs in resource assessment, planning, policy development and evaluation. A separate request has been made for the resources necessary to implement this program adequately.

Energy From Forest Biomass

119. Combustion of forest biomass accounts for about 4 percent of Canada's primary energy demand. This value could be raised to 10 percent of our current energy demand by more complete utilization of mill residues and use of the material left in the forest after conventional logging. There is also potential for cultivating fast-growing species in plantations. Growing and harvesting biomass for conversion to energy, however, requires development of new forest management practices and systems, and substantial R&D for its industrial use.
120. Caution must be noted on two potentially important issues. Using wood for energy may offer competition to the existing industry for pulpwood supply. This is already beginning to erode the pulpwood supply and raise the price in North America and Europe. The second concern is that biomass harvesting may have serious environmental and soil nutrient implications on some sites, a situation which must be examined carefully.
121. Recent studies have also revealed a potential side benefit from biomass use. The prospect exists for linking the rehabilitation of non-commercial hardwood timber stands with energy projects. The cost of such stand conversion is often prohibitive when conducted solely as a forest renewal project. However, initial research has shown that revenue from the sale of non-commercial trees to an energy facility could offset a major share of the clearing and regeneration costs.
122. In 1979, the federal government initiated the FIRE (Forest Industry Renewable Energy) program administered by EMR (Energy, Mines and Resources). This is a capital cost-sharing program to encourage substitution of wood residues and other biomass for fossil fuels in the generation of energy. Financial incentives of 10-20 percent of capital costs of such conversions are available up to 1986 from a fund of \$288 million. Also in 1979, \$30 million were made available for contract research in a 5-year ENFOR (Energy from the Forest) program to develop methods for growing and harvesting biomass, and converting it to energy. This program is managed by the CFS and is scheduled to end in March 1984.
123. Several provinces are also showing interest in biomass and initiating demonstration projects and some research. Ontario, for example, has budgeted \$1.5 million for the next five years for establishment of a biomass research institute.
124. Development of the potential of forest biomass for energy production is an integral part of the National Energy Program. Much R&D will probably remain to be done at the expiry of the ENFOR program in 1984. Present information suggests that this program should be extended, with the research dealing with the actual conversion of fuel becoming the responsibility of EMR and that related to growing and harvesting biomass remaining with the CFS.

Industry Structure

125. Timber is processed in 145 pulp and paper mills, nearly 400 large sawmills and several thousand smaller ones, 80 panel and plywood plants, and numerous operations producing other primary and secondary wood products. The lumber, pulp and paper sub-sectors which account for two thirds of the industry's total shipments, are developed in a relatively duty-free environment and are geared to export markets. The other sub-sectors were developed mainly to serve the Canadian market. As a result of the recently concluded Multilateral Trade Negotiations (MTN), some of these sub-sectors may require industrial restructuring to capture opportunities in foreign markets and to adjust to new import competition.

126. The strong financial position of the industry in the last two or three years has enabled many pulp and paper companies to undertake long overdue capital investment programs to modernize and expand existing operations, and to meet targets for pollution abatement and energy conservation and substitution. Much of this is catch-up investment and must be sustained in the coming years. Opportunities are open to stretch the existing wood supply and increase productivity by incorporating new processing technologies and by changing the product mix.
127. ITC is working on a development strategy for the forest products industry. There appears to be little need for new or expanded direct financial assistance to stimulate industry capital investment beyond those already in place.

Ownership

128. Canadian ownership of the pulp and paper industry was approximately 60 percent in the early 1970s. The Canadian share has since increased to about 70 percent, with the following companies among those having changed hands wholly or in part: Canadian International Paper, Columbia Cellulose, Crown Zellerbach Canada (Ocean Falls, B.C.), MacMillan Rothesay, Prince Albert Pulp, Prince George Pulp and Paper, Rayonier Canada (B.C. operations), and Reed Paper (Dryden, Ontario).
129. Canadian ownership of the sawmill and other wood industries has also increased and is now more than 80 percent. Several of the above companies produce lumber, as do the following which have undergone a change in status in recent years: Crows Nest Industries in B.C., and Simpson Timber and Swanson Lumber in Alberta. The domestic ownership ratio for the combined forest products industries thus stands at approximately 75 percent, compared with less than 50 percent for all manufacturing in Canada.

Capital Investment

130. Relatively few major greenfield developments are likely in the forest sector during the next 10 years. Most capital investment will go into modernizing and increasing the capacity of existing plants, and into improving harvesting operations. Capital demands should not exceed \$4 billion annually and much of this will be generated out of earnings.
131. The profitability of the forest products industry is characteristically cyclical. The wood products industries are now seriously depressed, due to a slump in housing starts. Lumber prices reached a peak over two years ago and are now sharply lower. The results are reflected in reduced profits and large-scale curtailments. The newsprint and pulp markets have begun to soften in recent months, resulting in reduced profitability but not yet in curtailed operations. This represents another short-term market slump, notwithstanding the projected longer term strength.

Transportation

132. Approximately 50 percent of Canada's pulp and paper and 40 percent of her lumber, plywood and other wood products are shipped from the mill to consumer by rail. The remainder goes mostly by truck, as do most of the logs from the woods to the mill. Exports outside North America are shipped by water, which is also an important means of transportation on the West Coast. The cost of moving logs from woods ranges from 30 to 60 percent of the total delivered cost of the wood at the mill, which underscores the importance of growing more of the timber in areas adjacent to the manufacturing site. The cost of shipping the final product to the market varies from 10 to 40 percent,

133. Canada's transportation system for wood is reasonably efficient, but there is undoubtedly room for improvement. For example, eliminating cross hauls of wood to the mills would lead to substantial savings in some areas. The use of water transportation on the East Coast has not been fully exploited. The industry objects to some railway rate structures and the time it takes to resolve appeals. Transport Canada, however, has assessed these problems and formulated recommendations to alleviate most of them.
134. Bottlenecks in the railway system are becoming increasingly troublesome, especially in the area west of Thunder Bay where much larger commodity tonnages are anticipated. Coal, potash, sulphur, grain and forest products will combine to place considerable strain on rail capacity. Fears are expressed that the system may require rationing of time before the end of the decade. This would pose severe problems for the companies affected, particularly the lumber and wood-based panel producers who tend to ship larger volumes in mid-year when construction activity peaks.

Regional Development

135. Regional development has already been referred to in Section 95. At present, the federal government is contributing \$60-\$70 million annually to cost-shared programs in support of forest management via DREE agreements. The federal government also contributes substantial funds to forest industry development under the pulp and paper mill modernization program referred to in Section 27, as well as smaller sums under the Regional Development Incentives Act. DREE is reappraising what form its development programs should take in the future. Most of the forestry agreements begin to phase out in 1984.
136. The forest sector clearly offers one of the best means of stabilizing or expanding economic activity in much of rural Canada. Forestry will continue to play a prominent role in correcting regional disparity. The sector is critically important in Atlantic Canada and British Columbia. Even in the combined prairie provinces forest products companies are the second most important employers in manufacturing.
137. In contrast to the above promise, failure of Canada's forest land managers to respond to the challenge of forest renewal will threaten the principal source of livelihood in as many as 100 forest-based communities by the year 2000.

Northern Development

138. As indicated earlier, there is little likelihood of major forest industry development in the Yukon and Northwest Territories during the next two decades. There are opportunities, however, for meeting local needs for lumber and energy, as well as creating some employment for native people. The technology exists for small but efficient sawmills for local lumber production. Technology is also being developed to use forest biomass for driving generators for electrification of small communities. This would eliminate the expense of flying in diesel oil and would provide employment in harvesting the wood and operating the system.

Native Land Claims

139. Considerable areas of productive forest land in Canada are subject to native land claims. In British Columbia, for example, over 12 million ha have been accepted as legitimate claims and are the subject of ongoing negotiations. Claims for another 3 million ha are under review to determine their legitimacy. Together they cover almost a third of the productive forest land in the province. In addition, the land claims north of 60 degrees embrace virtually all of the forests in the Yukon and the Northwest Territories. Large claims are also pending in Quebec

and Labrador. Smaller claims are being reviewed in other parts of the country. The uncertainty caused by this issue needs to be removed as early as possible.

International Forestry Role

140. For many years Canada has contributed to forestry aid in the less developed countries. The anticipated expenditures for 1981/82 are \$86 million, mainly through the Canadian International Development Agency (CIDA) but also via the International Development Research Centre (IDRC), the World Bank and other regional aid institutions. This aid is projected to increase by 17 percent annually, which is in line with a targeted increase in development assistance from 0.5 to 0.7 percent of GNP by 1990.
141. Much of the aid money is used to procure Canadian commodities, equipment and expertise. The transmission of the project-related aid relies heavily on the Canadian forestry and engineering consulting firms. The employees in these firms number in the thousands and have earned an excellent international reputation. Canada has the largest group of forest sector consultants working internationally.
142. There are important domestic aspects to international forestry as well. The forest industry and senior governments need information on forest resources, wood-using industries and trade in forest products of other countries, to enable intelligent entrepreneurial and policy decisions. There are many contacts with international agencies, such as FAO, Organization for Economic Cooperation and Development (OECD), the Timber Committee of the EEC, and the International Union of Forest Research Organizations. There are also bilateral forestry agreements with some countries, as well as innumerable contacts between industry, government agencies, associations, universities and so on.
143. Some of these activities clearly fall within the jurisdiction of other departments such as External Affairs, Finance, or ITC in matters of trade and tariffs, or CIDA and IDRC with respect to aid programs. Apart from these areas of specific responsibility, some more central focus to Canada's international forestry concerns seems desirable. As the chief source of forestry expertise and the designated lead agency for forestry within the federal government, it would seem appropriate that the Canadian Forestry Service take a more supportive role in international forestry. Some of the areas of interest are:
 - 1) Fulfilling our forestry liaison obligations to international agencies, such as FAO;
 - 2) Supporting Canada's commitments to developing countries (largely via CIDA and IDRC) through provision of advice, technical assistance, staff training, and project assessment;
 - 3) Providing a liaison and intelligence service on international forestry for the provincial and federal governments and the forest industry, and promoting the interests of the sector by arranging opportunities for participation in international forestry conferences; and
 - 4) Establishing and monitoring bilateral and the multilateral scientific and technical agreements with foreign governments.

Constitutional Issues

144. The provinces own most of Canada's productive forest land and carry the responsibility for seeing that it is managed to an acceptable level. Their jurisdiction, including the right to allocate or sell timber, is accepted without qualification. Forestry relations between the

provinces and the federal government have tended to be harmonious, even during recent constitutional debates and related discussions on resource policy.

145. At the same time it is recognized that the federal and provincial governments share the responsibility for the economic and regulatory climate in which forest management and industrial activity are carried out. This can lead to tensions, for example in the interpretation of fisheries legislation, the application of environmental regulations, and the registration of pesticides for use in forestry. There are outstanding issues in these areas now and they should be dealt with promptly.

E. ALTERNATIVES

146. Three different forest sector strategies can be used to describe the range of alternatives which exist:
 - 1) Decreased national effort to strengthen the resource base
 - 2) Maintenance of the sector's present productive capacity
 - 3) Increased effort to strengthen the resource and develop new products
147. A decrease in forest management means a deliberate decision to run down the capital assets in the forest and the mills. The negative consequences would be felt in economic, social and environmental terms. The impact would fall first in the areas in Atlantic Canada that are most vulnerable, and inevitably be transmitted throughout the entire economy. A deliberate policy of mining the forest resource would result in an immediate reduction of investments in the manufacturing sector. Widespread curtailments and unemployment would follow within 20-25 years.
148. Maintenance of the existing forest industry will necessitate expanded forest renewal and protection activity, together with supporting research. This is the minimum needed to stabilize the existing employment base.
149. The third alternative assumes adoption of the CCREM target of increasing the timber harvest by 40 percent between 1981 and the year 2000. This would entail new commitments by the provinces, industry and the federal government. The economic and social impact has been described as an increase in employment of 75,000-100,000, an additional \$12 billion in foreign exchange earnings, and a whole range of spinoffs throughout the economy.

F. PROGRAM EVALUATION

150. The effectiveness of current CFS programs has been evaluated over the past two years within the DOE program evaluation planning cycle. The findings from the evaluations have provided substantive input to the proposed strategy. One finding of the evaluations is the need for a more comprehensive and accurate resource data base to enable reliable indicators of program effectiveness to be developed. This need is addressed in Section 117.

151. Programs that arise from the proposed strategy will be structured within a suitable evaluation framework to enable the evaluation of the effectiveness and impacts of programs at appropriate milestone intervals. The evaluation will be scheduled within the existing DOE policy and plan for program evaluation and will address the economic benefits along these lines :

1. Improvement in the quality and quantity of forest species.
2. Reduction in losses caused by fire, insects and disease.
3. Technology transfer in areas such as genetic engineering and tree breeding.
4. Increased availability of researchers, professional foresters and woods labour.

G. INTERDEPARTMENTAL CONSULTATION

152. Strategy for the forest sector has been discussed at many meetings with members of the Federal Forestry Sector Strategy Committee. This particular paper has been discussed with officials of ITC, DREE, Finance, Treasury Board, Indian and Northern Affairs, EMR, Transport Canada, Agriculture Canada, the Ministers of State for Economic Development and Science and Technology and the Natural Sciences and Engineering Research Council.

H. PUBLIC INFORMATION CONSIDERATIONS

153. Public release of this paper is suggested at the meeting of the Canadian Council of Resource and Environment Ministers in Ottawa on September 29, 1981.

I. RECAPITULATION

154. The forest sector is a major component of the Canadian economy. It supports a million jobs, is the economic mainstay of much of rural Canada, and makes by far the largest net contribution to Canada's balance of payments. The Canadian forest industry is in a good position to capitalize on growing world demand for wood providing certain steps are taken. Some short-and medium-term market constraints must be overcome. Portions of the industry that developed under tariff protection must adapt to greater competition. The main challenge, however, is wood supply. The sector is in the difficult transition from harvesting wild forests to creating managed ones. Unless forest management becomes much more intensive, the industry will face shortages of economically available timber. More intensive forest management and better utilization are generating enormous demands for new knowledge. Canada's research effort in forestry and forest products is inadequate and a severe shortage of professional and scientific manpower has developed. Many of the constraints to be overcome are identified and a general strategy for the sector is suggested.

APPENDIX A

TABLES

| <u>TABLE NO.</u> | <u>TITLE</u> |
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| 1 | Summary of Land Area |
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TABLE 1
SUMMARY OF LAND AREA
(thousand km²)

| Province or Territory | Forest Land | Agricultural Land | Other Land | Total Land |
|-----------------------|-------------|-------------------|------------|------------|
| Newfoundland | 338 | -- | 32 | 370 |
| Prince Edward Island | 3 | 3 | -- | 6 |
| Nova Scotia | 41 | 4 | 7 | 53 |
| New Brunswick | 66 | 5 | 1 | 72 |
| Quebec | 614 | 41 | 702 | 1 357 |
| Ontario | 570 | 67 | 254 | 891 |
| Manitoba | 257 | 85 | 204 | 546 |
| Saskatchewan | 140 | 260 | 170 | 570 |
| Alberta | 341 | 241 | 62 | 644 |
| British Columbia | 521 | 24 | 386 | 931 |
| Northwest Territories | 307 | -- | 2 939 | 3 246 |
| Yukon | 219 | -- | 313 | 532 |
| Canada | 3 417 | 730 | 5 071 | 9 218 |
| Per cent | 37 | 8 | 55 | 100 |

Source: Forest Management Institute (1978)

TABLE 2
LAND AREA BY USE CLASSIFICATION
(thousand km²)

| | Non reserved Forest Land * | Improved Farm Land | Federal & Provincial Parks | Total incl. Other |
|-----------------------|-------------------------------|-----------------------|----------------------------------|-------------------------|
| Newfoundland | 335 | -- | 3 | 370 |
| Prince Edward Island | -- | 2 | -- | 6 |
| Nova Scotia | 40 | 2 | 1 | 53 |
| New Brunswick | 65 | 2 | 1 | 72 |
| Quebec | 435 | 23 | 195 | 1 357 |
| Ontario | 570 | 43 | 50 | 891 |
| Manitoba | 251 | 52 | 13 | 546 |
| Saskatchewan | 131 | 189 | 9 | 570 |
| Alberta | 318 | 118 | 62 | 644 |
| British Columbia | 482 | 7 | 46 | 931 |
| Yukon | 219 | -- | 22 | 532 |
| Northwest Territories | 295 | -- | 36 | 3 246 |
| Canada | 3 141 | 437 | 438 | 9 218 |
| Per cent | 34 | 5 | 5 | 100 |

* "Reserved" Forest Land is land that by law is not available for the growing or harvesting of forest crops.

Source: Canada Year Book; Canada's Forest Inventory (1976)

TABLE 3
INVENTORIED PRODUCTIVE FOREST LAND AREA
BY OWNERSHIP

(thousand km²)

| Province or Territory | Provincial Crown | Federal Crown | Private | All Ownerships |
|-----------------------|------------------|---------------|---------|----------------|
| Newfoundland | 81 | -- | 5 | 85 |
| Nova Scotia | 9 | -- | 29 | 38 |
| New Brunswick | 27 | -- | 34 | 61 |
| Quebec ^{1/} | 338 | -- | 35 | 373 |
| Ontario | 384 | 4 | 42 | 430 |
| Manitoba | 130 | 1 | 2 | 132 |
| Saskatchewan | 78 | 2 | -- | 80 |
| Alberta | 201 | 2 | -- | 203 |
| British Columbia | 474 | 3 | 5 | 482 |
| Northwest Territories | --- | 33 | -- | 33 |
| Yukon | --- | 67 | -- | 67 |
| Canada | 1 722 | 112 | 152 | 1 984 |
| Per cent | 87 | 5 | 8 | 100 |

^{1/} Inventory details for approximately 179 000 km² in Quebec are not yet available, thus Quebec is understated.

Source: Forest Management Institute (1978)

TABLE 4
ALLOWABLE ANNUAL CUT OF SOFTWOODS ON
PRODUCTION FOREST LANDS
 (thousand m³)

| Province or Territory | Allowable Annual Cut 1979 | Harvest (Avg. 1979/80) | Surplus or (Deficit) |
|-----------------------|---------------------------|------------------------|----------------------|
| Newfoundland | 2 940 | 2 594 | 346 |
| Prince Edward Island | 150 * | 150 | - |
| Nova Scotia | 3 273 | 3 804 | (531) |
| New Brunswick | 6 790 | 7 577 | (787) |
| Quebec | 36,000 | 28 352 | 7 648 |
| Ontario | 26 720 | 17 529 | 9 191 |
| Manitoba | 6 076 | 1 715 | 4 361 |
| Saskatchewan | 3 500 | 3 230 | 270 |
| Alberta | 14 639 | 7 170 | 7 469 |
| British Columbia | 73 483 ** | 75 199 | (1 716) |
| Yukon | 125 * | 125 | - |
| Northwest Territories | 54 * | 54 | - |
| Canada | 173 750 | 147 499 | 26 251 |

* No allowable cut is published for softwood.
 This figure is the same as the average harvest shown in column 2

** No allowable cut is available as yet in B.C. for private lands outside Tree Farm Licences and for some of the remaining old temporary tenures. The combined harvest from these lands probably exceeds a sustainable allowable cut. In the case of Crown provincial lands, the harvest is approximately equivalent to the annual allowable cut. The estimate shown here includes 5 million m³ for private land.

Source: Statistics Canada, Canadian Forestry Service and direct communications with the provinces, 1981.

TABLE 5
ALLOWABLE ANNUAL CUT OF HARDWOODS ON
PRODUCTION FOREST LAND
(thousand m³)

| Province or Territory | Allowable Annual Cut 1979 | Harvest (Avg. 1979/80) | Surplus or (Deficit) |
|--------------------------|---------------------------------|---------------------------|-------------------------|
| Newfoundland | 24 * | 24 | - |
| Prince Edward Island | 122 * | 122 | - |
| Nova Scotia | 1 404 | 527 | 877 |
| New Brunswick | 2 665 | 1 440 | 1 225 |
| Quebec | 14 000 | 4 067 | 9 933 |
| Ontario | 15 802 | 3 972 | 11 830 |
| Manitoba | 2 271 | 217 | 2 054 |
| Saskatchewan | 4 156 | 410 | 3 746 |
| Alberta | 13 531 | 78 | 13 453 |
| British Columbia | 226 * | 226 | - |
| Yukon | - | - | - |
| Northwest Territories | - | - | - |
| Canada | 54 201 | 11 083 | 43 118 |

* No allowable cut is published for hardwood.
This figure is the same as the average harvest
in column 2.

Source: Statistics Canada, Canadian Forestry Service and
direct communications with the provinces. 1981.

TABLE 6

PRINCIPAL STATISTICS - FOREST INDUSTRIES BY SECTOR

1979

| MANUFACTURING ACTIVITY | | | | | | | | | | TOTAL ACTIVITY | | |
|---------------------------|------------------|--------------------------------|---------|----------------------|------------------------|------------------------------------|-------------|--------------------|----------|---------------------|--------|-------------------|
| Sector | Estab-lish-ments | Production and Related Workers | | | | Millions of Dollars | | | | Total Employees | | Total Value Added |
| | | Man-hours Paid | Wages | Fuel and Electricity | Materials and Supplies | Value of Shipments Own Manufacture | Value Added | Salaries and Wages | Number * | Millions of Dollars | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| Logging | 2 849 | 48 317 | 96 268 | 927 | 102 | 3 003 | 5 021 | 2 035 | 57 971 | 1 115 | 2 053 | |
| Wood Industries | 3 208 | 103 025 | 216 455 | 1 687 | 183 | 4 927 | 8 808 | 3 965 | 123 043 | 2 074 | 4 021 | |
| Paper & Allied Industries | 732 | 98 667 | 204 986 | 1 802 | 960 | 5 654 | 12 287 | 5 733 | 128 933 | 2 491 | 5 756 | |
| Total | 6 789 | 250 009 | 517 709 | 4 416 | 1 245 | 13 589 | 26 116 | 11 733 | 309 947 | 5 680 | 11 830 | |

* Includes working owners and partners

Source: Statistics Canada

TABLE 7

PRINCIPAL STATISTICS BY PROVINCES

LOGGING

1979

| Province | LOGGING ACTIVITY | | | | | | | | | | TOTAL ACTIVITY | | |
|----------------------|--------------------------------|--------|-----------------------------|-------|----------------------|------------------------|------------------------------------|-------------|-------------------|--------|--------------------|---------------------|-------------------|
| | Production and Related Workers | | | | | Value of Shipments | | | | | Total Employees | | |
| | Estar-lish-ments | Number | Man-hours Paid Thousands | Wages | Fuel and Electricity | Materials and Supplies | Value of Shipments Own Manufacture | Value Added | Total Value Added | Number | Salaries and Wages | Millions of Dollars | Total Value Added |
| | | | | | | | | | | | | | |
| Newfoundland | 19 | 1 267 | 2 557 | 21 | 3 | 20 | 62 | 39 | 39 | 1 520 | 26 | 26 | 39 |
| Prince Edward Island | x | x | x | x | x | x | x | x | x | x | x | x | x |
| Nova Scotia | 173 | 985 | 2 102 | 11 | 2 | 64 | 92 | 28 | 28 | 1 317 | 14 | 14 | 29 |
| New Brunswick | 220 | 3 849 | 7 933 | 54 | 7 | 117 | 228 | 107 | 107 | 4 540 | 64 | 64 | 109 |
| Quebec | 363 | 10 899 | 22 211 | 198 | 26 | 311 | 704 | 353 | 353 | 13 303 | 237 | 237 | 356 |
| Ontario | 321 | 8 096 | 16 572 | 164 | 17 | 306 | 589 | 277 | 277 | 9 901 | 197 | 197 | 279 |
| Manitoba | 28 | 389 | 792 | 8 | x | 22 | 37 | 14 | 14 | 522 | 10 | 10 | 14 |
| Saskatchewan | 69 | 497 | 1 032 | 9 | 4 | 36 | 60 | 23 | 23 | 724 | 12 | 12 | 24 |
| Alberta | 96 | 919 | 1 893 | 17 | 2 | 40 | 74 | 35 | 35 | 1 204 | 22 | 22 | 36 |
| British Columbia | 1 559 | 21 416 | 41 176 | 445 | 41 | 2 092 | 3 175 | 1 159 | 1 159 | 24 940 | 533 | 533 | 1 167 |
| Yukon and N.W.T. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Total | 2 849 | 48 317 | 96 268 | 927 | 102 | 3 008 | 5,021 | 2 035 | 2 035 | 57 971 | 1 115 | 1 115 | 2 053 |

Note: Newfoundland includes data for the one establishment in P.E.I.
Total employees includes working owners and partners.

Source: Statistics Canada

TABLE 8

PRINCIPAL STATISTICS BY PROVINCES

WOOD INDUSTRIES

1979

| MANUFACTURING ACTIVITY | | | | | | | | | | TOTAL ACTIVITY | | |
|------------------------|--------------------------------|----------------|---------|-----------------|-----------|----------------------|------------------------|------------------------------------|-------------|-----------------|-----------|-------------------|
| Province | Production and Related Workers | | | | | Fuel and Electricity | Materials and Supplies | Value of Shipments Own Manufacture | Value Added | Total Employees | | Total Value Added |
| | Estab-lish-ments | Man-hours Paid | Wages | Total Employees | | | | | | | | |
| | | | | Number | Thousands | | | | | | | |
| | | | | | | | | | | Number | Thousands | |
| | | | | | | | | | | | | |
| 70 | 280 | 599 | 3 | 1 | 12 | 20 | 7 | 433 | 5 | 7 | | |
| Newfoundland | | | | | | | | | | | | |
| Prince Edward Island | 26 | x | x | x | x | x | x | x | 220* | x | x | |
| Nova Scotia | 141 | 1 828 | 3 864 | 19 | 2 | 43 | 92 | 48 | 2 208 | 23 | 49 | |
| New Brunswick | 156 | 3 772 | 8 427 | 47 | 9 | 142 | 239 | 99 | 4 394 | 57 | 100 | |
| Quebec | 994 | 24 087 | 53 392 | 303 | x | 830 | 1 609 | 813 | 30 135 | 396 | 828 | |
| Ontario | 761 | 19 283 | 40 815 | 252 | 31 | 691 | 1 320 | 620 | 23 129 | 320 | 629 | |
| Manitoba | 94 | 1 686 | 3 523 | 22 | 2 | 61 | 114 | 53 | 2 098 | 29 | 55 | |
| Saskatchewan | 46 | 1 527 | 3 091 | 24 | 4 | 68 | 119 | 51 | 1 877 | 31 | 52 | |
| Alberta | 200 | 5 523 | 11 513 | 82 | x | 234 | 446 | 210 | 7 005 | 112 | 227 | |
| British Columbia | 717 | 44 850 | 90 840 | 932 | 87 | 2 840 | 4 841 | 2 061 | 51 507 | 1 099 | 2 068 | |
| Yukon and N.W.T. | 3 | x | x | x | x | x | x | x | 37* | x | x | |
| Total | 3 208 | 103 025 | 216 455 | 1 687 | 183 | 4 927 | 8 808 | 3 965 | 123 043 | 2 074 | 4 021 | |

TABLE 9
PRINCIPAL STATISTICS BY PROVINCES
PAPER & ALLIED INDUSTRIES

1979

| Province | Estab- lish- ments | MANUFACTURING ACTIVITY | | | | | | | TOTAL ACTIVITY | | |
|-------------------------|--------------------------|--------------------------------|-------------------|-------|-------------------------|------------------------------|---|----------------|-----------------|--------------------------|-------------------------|
| | | Production and Related Workers | | | | Materials and Supplies | Value of Shipments Own Manufacture | Value Added | Total Employees | | Total Value Added |
| | | Number | Man-hours Paid | Wages | Fuel and Electricity | | | | Number | Salaries and Wages | |
| | | | | | | | | | | | |
| Newfoundland | 8 | x | x | x | x | x | x | x | 2 520* | x | x |
| Prince Edward Island | - | - | - | - | - | - | - | - | - | - | - |
| Nova Scotia | 14 | 2 356 | 5 168 | 42 | 34 | 117 | 316 | 169 | 3 175 | 59 | 168 |
| New Brunswick | 18 | 4 818 | 9 647 | 88 | 102 | 295 | 640 | 244 | 6 145 | 117 | 252 |
| Quebec | 221 | 34 142 | 71 240 | 606 | 328 | 1 806 | 4 016 | 1 900 | 44 338 | 824 | 1 902 |
| Ontario | 334 | 35 811 | 74 456 | 600 | 253 | 2 008 | 3 872 | 1 643 | 46 179 | 827 | 1 662 |
| Manitoba | 27 | x | x | x | x | x | x | x | 1 800* | x | x |
| Saskatchewan | 6 | x | x | x | x | x | x | x | 1 200* | x | x |
| Alberta | 30 | 1 913 | 3 975 | 35 | 11 | 156 | 283 | 114 | 2 576 | 47 | 118 |
| British Columbia | 74 | 15 070 | 30 632 | 339 | 191 | 1 021 | 2 537 | 1 328 | 21 000 | 506 | 1 323 |
| Yukon and N.W.T. | - | - | - | - | - | - | - | - | - | - | - |
| Total | 732 | 98 667 | 204 986 | 1 802 | 960 | 5 654 | 12 287 | 5 733 | 128 933 | 2 491 | 5 756 |

* Estimated - Canadian Forestry Service and includes working owners and partners

Source: Statistics Canada

TABLE 10

EMPLOYMENT BY FOREST INDUSTRY SECTOR

1979

| | Logging | Wood Industries | Paper & Allied Industries | Total |
|----------------------------------|---------|--------------------|---------------------------------|---------|
| Newfoundland | 1 520 | 433 | 2 520 * | 4 473 |
| Prince Edward Island | - | 220 * | - | 220 |
| Nova Scotia | 1 317 | 2 208 | 3 175 | 6 700 |
| New Brunswick | 4 540 | 4 394 | 6 145 | 15 079 |
| Quebec | 13 303 | 30 135 | 44 338 | 87 776 |
| Ontario | 9 901 | 23 129 | 46 179 | 79 209 |
| Manitoba | 522 | 2 098 | 1 800 * | 4 420 |
| Saskatchewan | 724 | 1 877 | 1 200 * | 3 801 |
| Alberta | 1 204 | 7 005 | 2 576 | 10 785 |
| British Columbia | 24 940 | 51 507 | 21 000 | 97 447 |
| Yukon & Northwest Territories | - | 37 * | - | 37 |
| Canada | 57 971 | 123 043 | 128 933 | 309 947 |

* Estimated - Canadian Forestry Service

Source: Statistics Canada

TABLE 11
ROUNDWOOD PRODUCTION BY PROVINCE
 (thousand m³)

| Year | New found- land | Prince Edward Island | Nova Scotia | New Brun- swick | Quebec | Ontario | Mani- toba | Saskat- chewan | Alberta | British Columbia | Yukon & N.W.T. | Total Canada |
|------|-----------------------|----------------------------|----------------|-----------------------|--------|---------|---------------|-------------------|---------|---------------------|-------------------|-----------------|
| 1950 | 3 200 | 283 | 3 313 | 5 635 | 27 694 | 14 611 | 1 614 | 1 982 | 3 596 | 23 588 | 85 | 85 602 |
| 1960 | 3 597 | 311 | 2 775 | 5 295 | 24 919 | 15 319 | 1 274 | 1 416 | 4 191 | 33 980 | 170 | 93 247 |
| 1970 | 2 849 | 245 | 3 224 | 6 815 | 28 899 | 16 801 | 1 260 | 2 375 | 4 144 | 54 726 | 83 | 121 419 |
| 71 | 2 324 | 212 | 3 236 | 6 905 | 26 581 | 15 839 | 1 556 | 2 292 | 4 138 | 56 551 | 68 | 119 701 |
| 72 | 2 355 | 186 | 3 256 | 7 225 | 27 827 | 17 361 | 1 835 | 2 641 | 4 893 | 56 451 | 97 | 124 131 |
| 73 | 2 952 | 172 | 3 596 | 8 868 | 29 350 | 18 446 | 1 828 | 2 718 | 5 599 | 70 137 | 140 | 143 806 |
| 74 | 3 211 | 190 | 3 996 | 8 781 | 32 712 | 18 867 | 2 101 | 2 777 | 5 058 | 60 086 | 147 | 137 928 |
| 1975 | 2 452 | 167 | 3 539 | 6 906 | 28 407 | 14 215 | 2 022 | 2 313 | 4 964 | 50 078 | 198 | 115 262 |
| 76 | 2 345 | 165 | 3 455 | 7 479 | 29 058 | 17 743 | 1 742 | 2 866 | 5 627 | 69 521 | 128 | 140 126 |
| 77 | 2 195 | 138 | 3 676 | 7 702 | 31 063 | 19 269 | 1 784 | 2 958 | 6 371 | 69 971 | 133 | 145 262 |
| 78 | 2 288 | 159 | 4 157 | 8 509 | 34 079 | 20 187 | 1 803 | 2 863 | 6 519 | 75 164 | 167 | 155 895 |
| 79 | 2 481 | 223 | 4 389 | 8 750 | 35 736 | 21 294 | 1 903 | 3 579 | 6 995 | 76 195 | 212 | 161 757 |
| 1980 | 2 800 | 300 | 4 300 | 9 300 | 35 100 | 21 700 | 1 960 | 3 700 | 7 500 | 74 700 | 140 | 161 500 |

Source: Statistics Canada

TABLE 12
LUMBER PRODUCTION BY PROVINCE
(thousand m³)

| Year | New found- land | Prince Edward Island | Nova Scotia | New Brun- swick | Quebec | Ontario | Mani- toba | Saskat- chewan | Alberta | British Columbia | Yukon & N.W.T. | Total Canada |
|--------------|-----------------------|----------------------------|----------------|-----------------------|--------|---------|---------------|-------------------|---------|---------------------|-------------------|-----------------|
| 1950 | 106 | 28 | 663 | 706 | 2 667 | 1 935 | 137 | 155 | 781 | 8 281 | 7 | 15 468 |
| 1960 | 68 | 19 | 548 | 656 | 2 634 | 1 484 | 80 | 158 | 727 | 12 520 | 14 | 18 909 |
| 1970 | 83 | 28 | 465 | 661 | 3 786 | 2 004 | 122 | 248 | 1 099 | 18 071 | 16 | 26 580 |
| 71 | 76 | 33 | 373 | 677 | 4 052 | 2 110 | 165 | 285 | 1 180 | 21 092 | 12 | 30 056 |
| 72 | 75 | 28 | 441 | 736 | 4 975 | 2 280 | 236 | 394 | 1 395 | 22 436 | 9 | 33 005 |
| 73 | 118 | 33 | 472 | 703 | 5 563 | 2 672 | 184 | 394 | 1 902 | 24 602 | 7 | 36 650 |
| 74 | 87 | 28 | 468 | 716 | 5 276 | 2 831 | 274 | 289 | 1 521 | 20 628 | 6 | 32 124 |
| 1975 | 70 | 28 | 387 | 680 | 4 787 | 2 313 | 193 | 264 | 1 003 | 17 569 | 10 | 27 305 |
| 76 | 102 | 28 | 443 | 769 | 5 731 | 2 773 | 228 | 460 | 1 201 | 25 074 | 11 | 36 822 |
| 77 | 113 | 28 | 435 | 756 | 6 493 | 3 191 | 233 | 514 | 1 477 | 28 378 | 14 | 41 633 |
| 78 | 113 | 38 | 448 | 935 | 7 572 | 3 828 | 250 | 488 | 1 631 | 29 570 | 14 | 44 887 |
| 79 | 118 | 40 | 492 | 1 059 | 8 119 | 4 150 | 270 | 444 | 1 622 | 30 358 | 28 | 46 700 |
| 1980 p 118 e | | 40 e | 436 | 1 116 | 8 023 | 4 271 | 216 | 380 | 1 614 | 28 269 | 28 e | 44 511 |

Source: Statistics Canada

TABLE 13

SELECTED WOOD-BASED PANEL PRODUCT SHIPMENTS

(thousand m³)

| | Plywood | | Particleboard ^{1/} | | Total |
|------|---------------------|----------|-----------------------------|---------|-------|
| | Softwood | Hardwood | Type 1 | Type 11 | |
| 1950 | 258 | 57 | .. | .. | .. |
| 1960 | 917 | 152 | .. | .. | .. |
| 1970 | 1 664 | 191 | .. | .. | 257 |
| 71 | 1 856 | 209 | .. | .. | 378 |
| 72 | 1 995 | 226 | .. | .. | 475 |
| 73 | 2 149 | 250 | .. | .. | 565 |
| 74 | 1 842 | 218 | .. | .. | 510 |
| 1975 | 1 979 | 180 | .. | .. | 563 |
| 76 | 2 134 | 190 | 285 | 473 | 758 |
| 77 | 2 359 | 194 | 384 | 513 | 897 |
| 78 | 2 576 | 217 | 457 | 617 | 1 074 |
| 79 | 2 379 ^{2/} | x | 528 | 704 | 1 232 |
| 1980 | 2 404 | .. | 577 | 724 | 1 301 |

^{1/} Type 1 is particleboard of the waferboard type made with a waterproof resin binder

^{2/} In 1979 the Statistics Canada survey changed to include all construction-type plywood. The figure shown excludes poplar in order to maintain a comparable series.

Source: Statistics Canada

TABLE 14
WOOD PULP PRODUCTION BY REGION
(thousand metric tons)

| | Quebec | Ontario | British Columbia | Atlantic Provinces | Prairie Provinces | Total |
|------|--------|---------|---------------------|-----------------------|----------------------|--------|
| 1950 | 3 559 | 2 085 | 705 | 1 008 | 331 | 7 688 |
| 1960 | 4 055 | 2 692 | 1 927 | 1 430 | 294 | 10 398 |
| 1970 | 5 898 | 3 601 | 4 100 | 2 491 | 520 | 16 610 |
| 71 | 5 666 | 3 447 | 4 409 | 2 419 | 601 | 16 543 |
| 72 | 5 894 | 3 572 | 4 576 | 2 767 | 646 | 17 455 |
| 73 | 5 591 | 3 669 | 5 337 | 3 217 | 750 | 18 565 |
| 74 | 6 353 | 3 877 | 5 267 | 3 305 | 877 | 19 679 |
| 75 | 5 198 | 2 540 | 3 998 | 2 560 | 817 | 15 113 |
| 76 | 5 882 | 3 060 | 5 320 | 2 784 | 902 | 17 946 |
| 77 | 5 860 | 3 662 | 4 831 | 2 876 | 940 | 18 168 |
| 78 | 6 632 | 4 127 | 5 426 | 2 941 | 1 027 | 20 152 |
| 79 | 6 869 | 4 322 | 5 523 | 2 956 | 1 058 | 20 728 |
| 1980 | | | | | | 19 945 |

Source: Statistics Canada

Note: Approximately 76% used in production of paper and board in Canada.

TABLE 15

PAPER PRODUCTION BY PROVINCE
(thousand metric tons)

| Year | Quebec | | | | Ontario | | | British Columbia | | Other Provinces | | Canada | |
|------|------------|----------------------|-------|------------|----------------------|-------|----------------------------|----------------------|-------|-----------------|----------------------|--------|-------|
| | News-print | Paper and paperboard | Total | News-print | Paper and Paperboard | Total | Total Paper and Paperboard | Paper and Paperboard | Total | News-print | Paper and Paperboard | Total | Total |
| | | | | | | | | | | | | | |
| 1950 | 2 510 | 499 | 3 009 | 1 125 | 602 | 1 727 | 452 | 993 | | 4 826 | 1 355 | 6 180 | |
| 1960 | 2 863 | 680 | 3 544 | 1 459 | 855 | 2 314 | 1 043 | 1 195 | | 6 069 | 2 027 | 8 096 | |
| 1970 | 3 766 | 1 298 | 5 064 | 1 686 | 1 198 | 2 883 | 1 675 | 1 631 | | 7 997 | 3 257 | 11 254 | |
| 71 | 3 609 | 1 348 | 4 957 | 1 609 | 1 220 | 2 830 | 1 826 | 1 545 | | 7 734 | 3 428 | 11 162 | |
| 72 | 3 793 | 1 529 | 5 322 | 1 625 | 1 310 | 2 935 | 1 834 | 1 791 | | 8 080 | 3 802 | 11 882 | |
| 73 | 3 671 | 1 559 | 5 230 | 1 769 | 1 464 | 3 233 | 2 029 | 2 093 | | 8 359 | 4 225 | 12 584 | |
| 74 | 4 079 | 1 657 | 5 736 | 1 778 | 1 626 | 3 404 | 1 952 | 2 128 | | 8 712 | 4 507 | 13 219 | |
| 1975 | 3 529 | 1 236 | 4 765 | 1 140 | 959 | 2 099 | 1 477 | 1 725 | | 7 010 | 3 056 | 10 066 | |
| 76 | 3 931 | 1 447 | 5 378 | 1 411 | 1 181 | 2 592 | 1 977 | 1 844 | | 8 063 | 3 728 | 11 791 | |
| 77 | 3 726 | 1 560 | 5 286 | 1 610 | 1 476 | 3 086 | 1 952 | 1 813 | | 8 066 | 4 070 | 12 136 | |
| 78 | 4 124 | 1 830 | 5 954 | 1 663 | 1 654 | 3 317 | 2 137 | 1 967 | | 8 739 | 4 637 | 13 376 | |
| 79 | 4 075 | 1 996 | 6 071 | 1 743 | 1 810 | 3 553 | 2 154 | 1 863 | | 8 642 | 4 999 | 13 641 | |
| 1980 | | | | | | | | | | 8 625 | 4 765 | 13 390 | |

Source: Statistics Canada

TABLE 16

DOMESTIC EXPORTS OF FOREST PRODUCTS
TO PRINCIPAL TRADE AREAS

1980

(million dollars)

| | Softwood Lumber | Wood- Pulp | News- print | Other | Total | % |
|-----------|--------------------|---------------|----------------|-------|--------|------|
| U.S.A. | 1 977 | 1 912 | 2 927 | 1 258 | 8 074 | 63 |
| U.K. | 233 | 204 | 251 | 157 | 845 | 7 |
| Other EEC | 269 | 889 | 87 | 237 | 1 482 | 11 |
| Japan | 501 | 458 | 9 | 137 | 1 105 | 9 |
| Australia | 62 | 39 | 66 | 29 | 196 | 1 |
| Other | 220 | 368 | 342 | 181 | 1 111 | 9 |
| Total | 3 262 | 3 870 | 3 682 | 1 999 | 12 813 | 100% |

Source: Statistics Canada

TABLE 17
1980 TRADE BALANCE
(million dollars)

| | Imports | Exports | Net Flow (+ out) (- in) |
|---|---------------|--------------|-------------------------------|
| <u>Forest Industry</u> | | | |
| Lumber | 236 | 3 367 | + 3 131 |
| Plywood, veneer, boards | 87 | 237 | + 150 |
| Woodpulp | 75 | 3 870 | + 3 795 |
| Newsprint | - | 3 682 | + 3 682 |
| Other paper & paperboard | 390 | 949 | + 559 |
| Pulpwood | 14 | 26 | + 12 |
| Pulpwood chips | 2 | 91 | + 89 |
| Other crudewood materials | 83 | 105 | + 22 |
| Other products | <u>131</u> | <u>405</u> | + <u>274</u> |
| | 1 018 | 12 732 | + 11 714 |
| <u>Farm Products, Food & Beverage</u> (incl. live animals) | 4 803 | 8 270 | + 3 467 |
| <u>Crude Materials, inedible</u> | | | |
| Coal | 811 | 934 | + 123 |
| Crude petroleum | 6 921 | 2 899 | - 4 022 |
| Natural gas | - | 3 984 | + 3 984 |
| Metal ores, concentrates & scrap | 2 125 | 4 216 | + 2 091 |
| Other materials | <u>1 676</u> | <u>2 505</u> | + <u>829</u> |
| | 11 533 | 14 538 | + 3 005 |
| <u>Fabricated Products, inedible</u> | | | |
| Textiles | 1 275 | 259 | - 1 016 |
| Chemicals incl. fertilizers | 3 354 | 4 093 | + 739 |
| Iron & Steel | 1 415 | 2 083 | + 668 |
| Non-ferrous metals | 2 579 | 6 090 | + 3 511 |
| Electricity | - | 773 | + 773 |
| Other products | <u>3 235</u> | <u>3 772</u> | + <u>537</u> |
| | 11 858 | 17 070 | + 5 212 |
| <u>End Products, inedible</u> | | | |
| Machinery | 8 843 | 3 405 | - 5 438 |
| Transportation & automotive | 15 911 | 13 706 | - 2 205 |
| Other, incl. household & personal goods | <u>14 399</u> | <u>6 022</u> | - <u>8 377</u> |
| | 39 153 | 23 133 | - 16 020 |
| <u>Total (incl. Special Trade Transactions)</u> | 69 128 | 75 964 | + 6 826 |

Source: Statistics Canada

TABLE 18
CORPORATE PROFITS - AFTER TAX
QUARTERLY RATES SEASONALLY ADJUSTED

(million dollars)

WOOD INDUSTRIES - INCLUDES FURNITURE

| Year | First Quarter | Second Quarter | Third Quarter | Fourth Quarter | Annual |
|------|------------------|-------------------|------------------|-------------------|--------|
| 73 | 51 | 68 | 53 | 59 | 231 |
| 74 | 50 | 56 | 22 | 9 | 137 |
| 1975 | 18 | 39 | 3 | 28 | 88 |
| 76 | 42 | 35 | 39 | 53 | 169 |
| 77 | 51 | 41 | 68 | 69 | 229 |
| 78 | 63 | 103 | 105 | 110 | 381 |
| 79 | 133 | 148 | 139 | 104 | 524 |
| 1980 | 70 | 38 | 50 | 83 | 241 |
| 81 | 55 | | | | |

PAPER & ALLIED INDUSTRIES & FORESTRY

| | | | | | |
|------|-----|-----|-----|-----|-------|
| 73 | -13 | 81 | 82 | 99 | 249 |
| 74 | 140 | 170 | 205 | 174 | 689 |
| 1975 | 132 | 130 | 55 | 20 | 337 |
| 76 | 30 | 87 | 81 | 88 | 286 |
| 77 | 80 | 77 | 107 | 90 | 354 |
| 78 | 104 | 104 | 217 | 265 | 690 |
| 79 | 301 | 300 | 55 | 371 | 1 027 |
| 1980 | 392 | 464 | 382 | 441 | 1 679 |
| 81 | 313 | | | | |

ALL MANUFACTURING

| | | | | | |
|------|-------|-------|-------|-------|--------|
| 73 | 793 | 893 | 953 | 1 093 | 3 732 |
| 74 | 1 220 | 1 249 | 1 288 | 1 091 | 4 848 |
| 1975 | 1 045 | 1 157 | 1 076 | 1 049 | 4 327 |
| 76 | 1 095 | 1 138 | 1 025 | 959 | 4 217 |
| 77 | 1 059 | 1 105 | 1 163 | 1 302 | 4 629 |
| 78 | 1 306 | 1 465 | 1 640 | 1 928 | 6 339 |
| 79 | 2 136 | 2 254 | 2 227 | 2 560 | 9 177 |
| 1980 | 2 495 | 2 597 | 2 490 | 2 695 | 10 277 |
| 81 | 2 523 | | | | |

Source: Statistics Canada

TABLE 19
CAPITAL AND REPAIR EXPENDITURES
FOREST INDUSTRIES
(million dollars)

| | Logging | Wood Industries | Paper and Allied Industries | Total |
|----------|---------|--------------------|-----------------------------------|---------|
| 1960 | 102.4 | 75.6 | 269.4 | 447.4 |
| 1970 | 173.0 | 224.3 | 758.4 | 1 155.7 |
| 71 | 182.0 | 244.0 | 781.5 | 1 207.5 |
| 72 | 216.0 | 287.7 | 708.4 | 1 212.1 |
| 73 | 302.0 | 416.8 | 712.8 | 1 431.6 |
| 74 | 391.4 | 443.1 | 967.9 | 1 802.4 |
| 1975 | 359.1 | 408.9 | 954.7 | 1 722.7 |
| 76 | 382.0 | 445.1 | 1 186.6 | 2 013.7 |
| 77 | 439.5 | 466.0 | 1 289.4 | 2 194.9 |
| 78 | 502.5 | 590.9 | 1 260.5 | 2 353.9 |
| 79 | 589.1 | 716.5 | 1 550.9 | 2 856.5 |
| 1980 (1) | 635.1 | 718.2 | 2 106.3 | 3 459.6 |
| 81 (2) | 712.2 | 810.4 | 2 755.8 | 4 278.4 |
| 81 (3) | 696.8 | 834.2 | 3 000.1 | 4 531.1 |

(1) Preliminary actual expenditures

(2) Intentions

(3) Revised intentions

Source: Statistics Canada

TABLE 20
PUBLIC EXPENDITURE ON FOREST MANAGEMENT
BY FUNCTION IN 1979

(million dollars)

| | <u>Provinces</u> | | <u>Federal</u> | | <u>Total</u> |
|-------------------------------------|----------------------------|------------------------------|--------------------------------|--------------|--------------|
| | <u>own</u> <u>funds</u> | <u>via</u> <u>federal</u> | <u>terri-</u> <u>tories</u> | <u>other</u> | |
| Silviculture | 118.9 | 32.5 | - | 4.8 | 156.2 |
| Protection | 126.1 | 0.4 | 7.6 | 9.0 | 143.1 |
| Access development | 64.6 | 14.1 | - | - | 78.7 |
| Research | 8.5 | 0.8 | 0.1 | 5.1 | 14.5 |
| Inventory | 14.5 | 1.1 | 0.4 | 0.2 | 16.2 |
| Forest land acquisition | 2.0 | 0.2 | - | - | 2.2 |
| Administration and miscellaneous | 171.4 | 2.9 | 3.2 | 23.6 | 201.1 |
| | 506.0 | 52.0 | 11.3 | 42.7 | 612.0 |

Note: One of the more important figures is silviculture, which consists principally of regeneration and timber stand improvement. The 1979 figure of \$156.2 million is equivalent to 5 cents on each dollar of tax revenue generated from the forest sector.

Source: Canadian Pulp and Paper Association

TABLE 21

ESTIMATED PUBLIC REVENUE GENERATED
BY FOREST INDUSTRY ACTIVITY IN 1979

(million dollars)

| | Provincial | Federal | Total |
|------------------------------------|------------|---------|---------|
| Forest Resource | | | |
| - stumpage, royalty, other fees | 679.7 | - | 679.7 |
| Logging Tax | 54.5 | - | 54.5 |
| Income Tax | | | |
| - paid by firms | 294.2 | 542.3 | 836.5 |
| - paid by employees | 412.0 | 648.6 | 1 060.6 |
| Manufacturers Excise Tax | - | 88.3 | 88.3 |
| Other Sales Taxes | | | |
| - paid by firms | 189.1 | - | 189.1 |
| - paid by employees | 105.5 | - | 105.5 |
| Import Duties | - | 32.5 | 32.5 |
| | 1 735.0 | 1 311.7 | 3 046.7 |
| Source of Revenue | | | |
| - corporations | 1 217.5 | 663.1 | 1 880.6 |
| - employees | 517.5 | 648.6 | 1 166.1 |

Source: Canadian Pulp and Paper Association

TABLE 22
WORLD EXPORTS - FOREST PRODUCTS

1978

(million U.S. dollars)

| | Round- wood | Lumber | Wood Based Panels | Wood Pulp | Paper & Paper- board | Total |
|-----------------------------------|----------------|--------|-------------------------|--------------|----------------------------|--------|
| Total North America ^{1/} | 1 482 | 3 434 | 384 | 2 740 | 4 163 | 12 203 |
| Canada | 100 | 2 866 | 195 | 1933 | 3 058 | 8 152 |
| United States | 1 382 | 568 | 189 | 807 | 1 105 | 4 051 |
| South America | 31 | 133 | 113 | 165 | 108 | 550 |
| Scandinavia ^{2/} | 112 | 1 722 | 412 | 1 747 | 4 060 | 8 053 |
| USSR | 697 | 945 | 150 | 239 | 317 | 2 348 |
| S.E. Asia ^{3/} | 1 818 | 684 | 330 | - | 19 | 2 851 |
| Africa | 580 | 151 | 72 | 121 | 45 | 969 |
| Oceania | 170 | 49 | 14 | 74 | 100 | 407 |
| Other | 831 | 1 997 | 2 212 | 418 | 4 687 | 10 245 |
| Total | 5 721 | 9 115 | 3 687 | 5 504 | 13 499 | 37 526 |

^{1/} Mexico included in Central America

^{2/} Including Finland

^{3/} Indonesia, Malaysia, Philippines, Singapore

Source: Food and Agriculture Organization

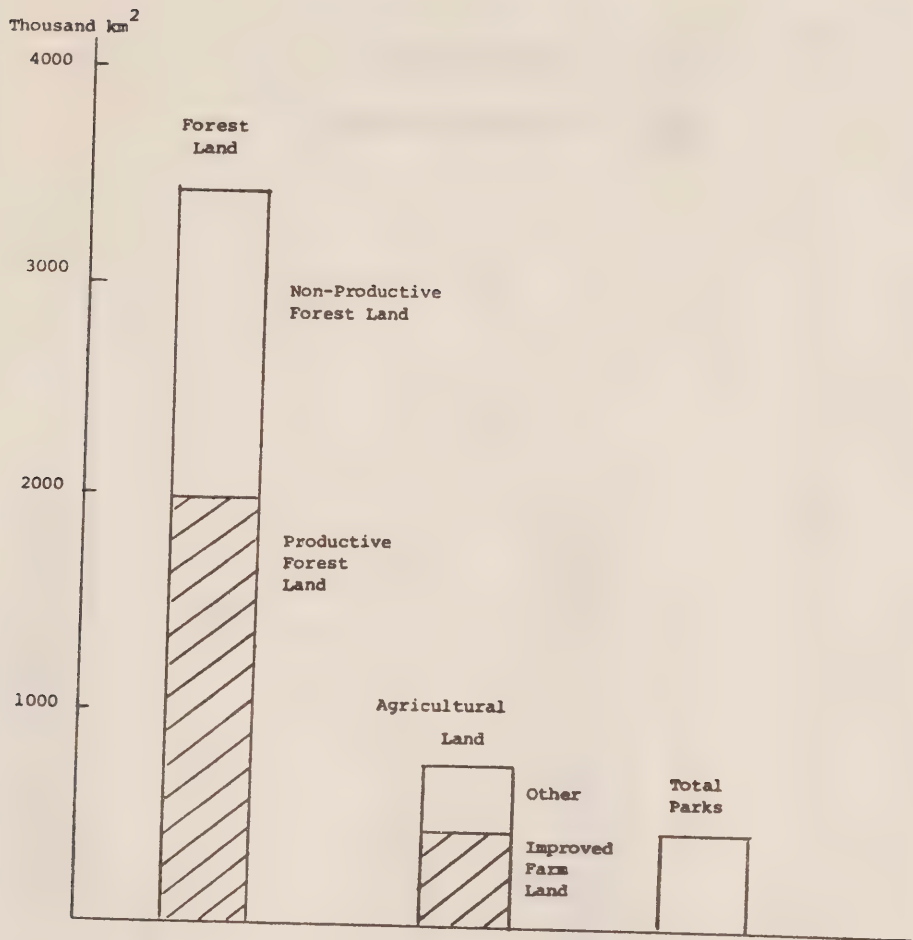
APPENDIX B

CHARTS

| <u>CHART NO.</u> | <u>TITLE</u> |
|------------------|--|
| 1 | Comparison of Forest Land with Agricultural Land and Parks |
| 2 | Comparison Allowable Annual Cut with Primary Forest Production |
| 3 | Monthly Selling Price Indexes - Lumber, Softwood, Spruce, British Columbia Interior |
| 4 | Monthly Selling Price Indexes - Lumber, Softwood, Spruce, East of the Rockies |
| 5 | Monthly Selling Price Indexes - Plywood, Softwood, Spruce and Pine |
| 6 | Monthly Selling Price Indexes - Wood-Pulp, Sulphate and Soda, Paper Grades, Bleached, Softwood, for Export |
| 7 | Monthly Selling Price Indexes - Newsprint, White in Rolls, for Export |
| 8 | Corporate Profits - After Tax, Wood Industries including Furniture |
| 9 | Corporate Profits - After Tax, Paper and Allied Industries and Forestry |

CHART 1

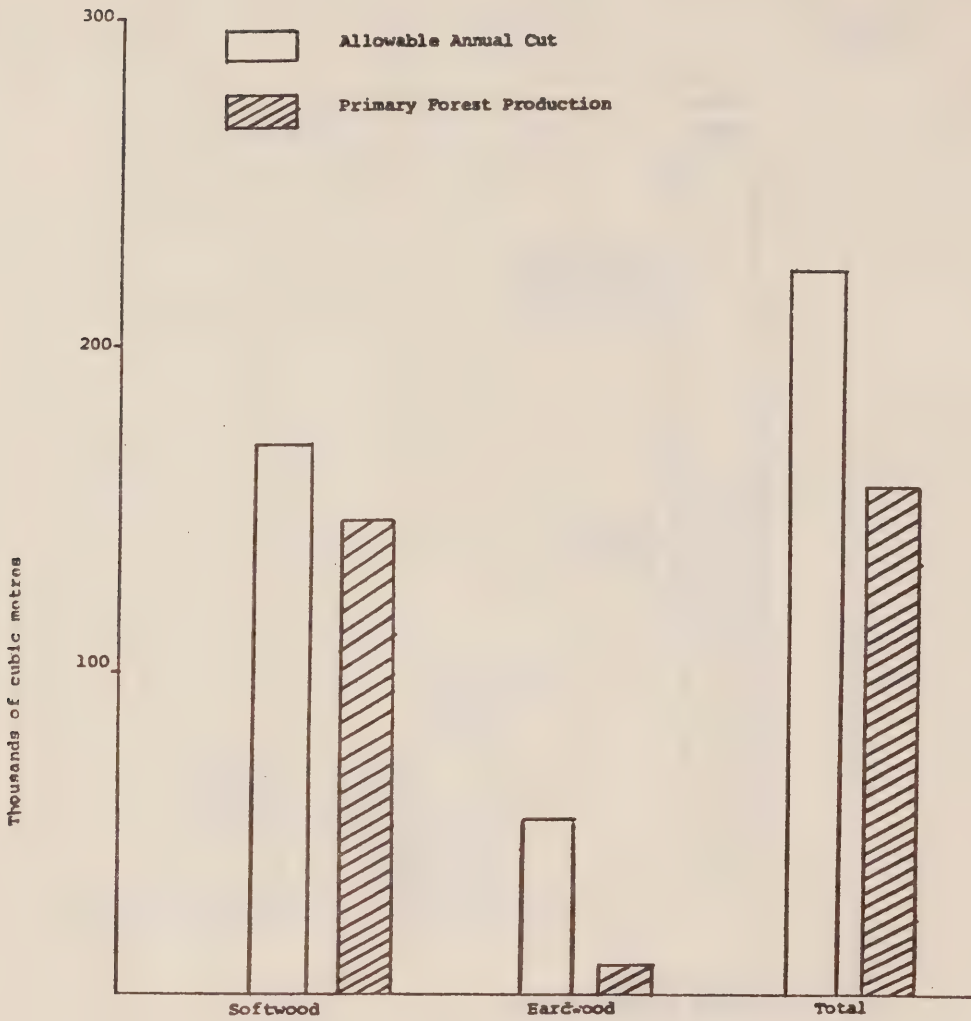
COMPARISON OF FOREST LAND WITH
AGRICULTURAL LAND AND PARKS



Source: Canada Year Book
Canadian Forestry Service

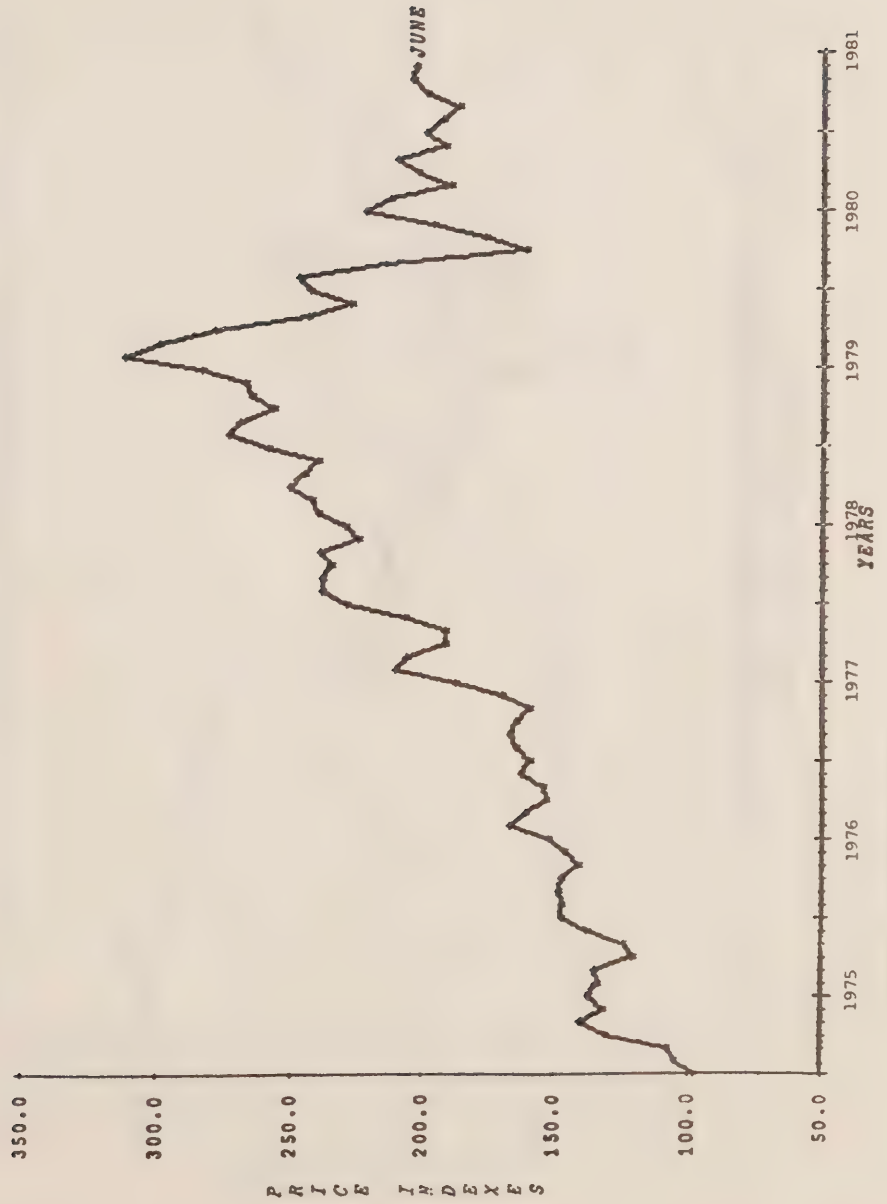
CHART 2

COMPARISON ALLOWABLE ANNUAL CUT WITH PRIMARY FOREST PRODUCTION



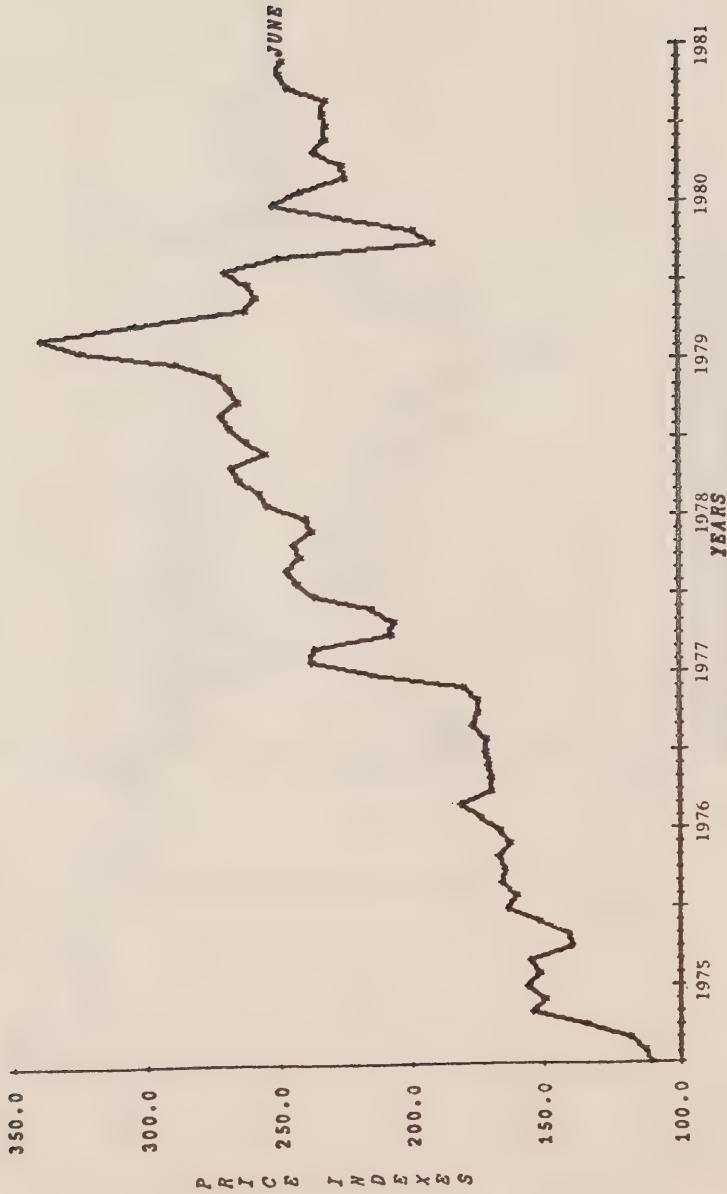
Source: Canadian Forestry Service Estimates, 1981

MONTHLY SELLING PRICE INDEXES
LUMBER, SOFTWOOD, SPRUCE, BRITISH COLUMBIA INTERIOR



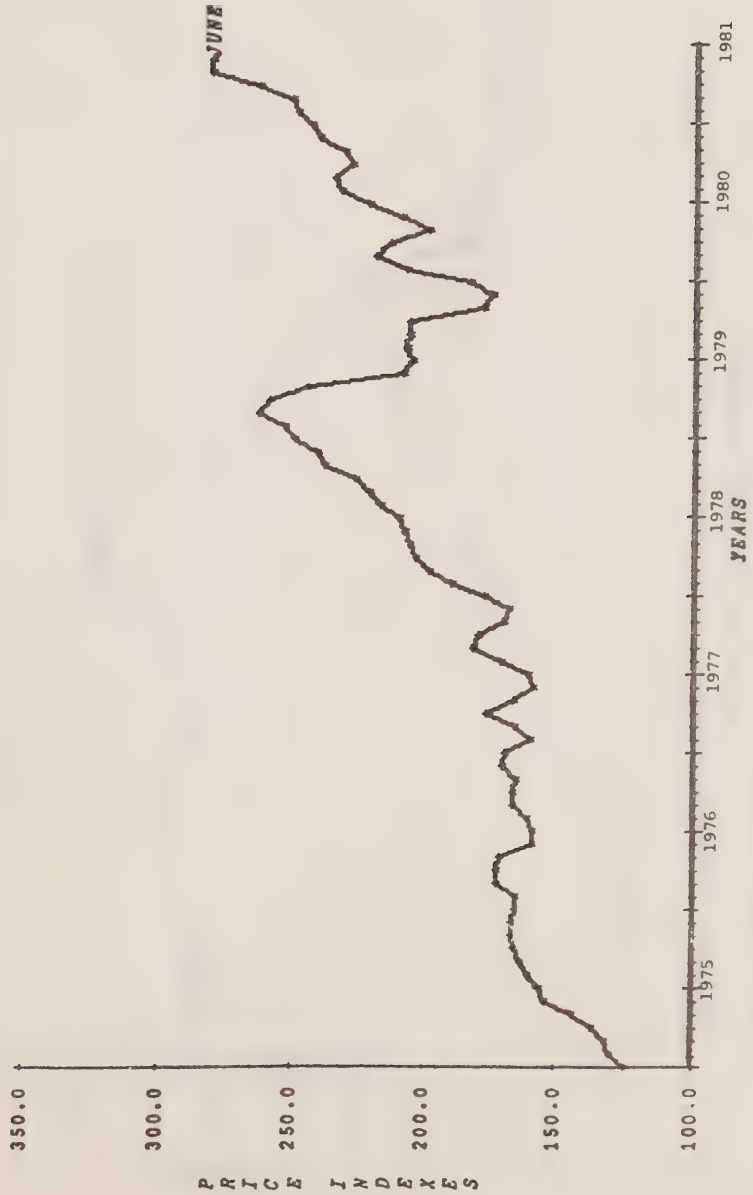
Source: Statistics Canada

MONTHLY SELLING PRICE INDEXES
LUMBER, SOFTWOOD, SPRUCE, EAST OF THE ROCKIES



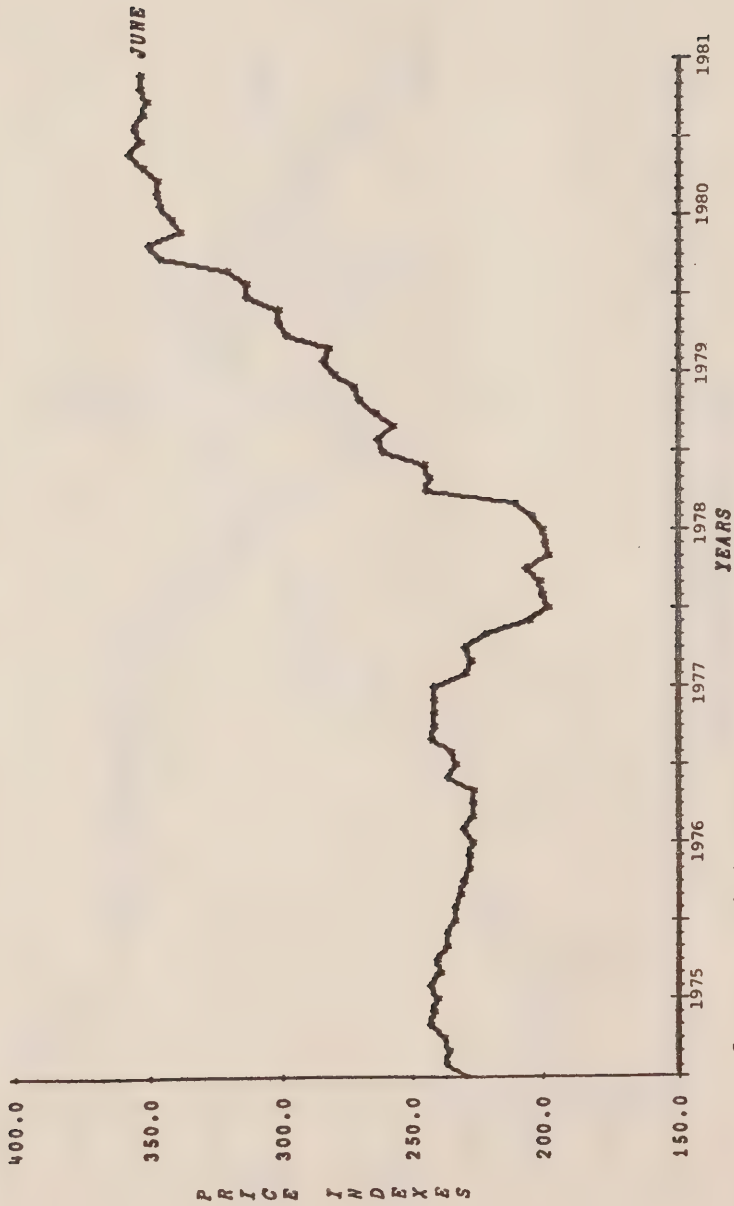
Source: Statistics Canada

MONTHLY SELLING PRICE INDEXES
PLYWOOD, SOFTWOOD, SPRUCE, AND PINE



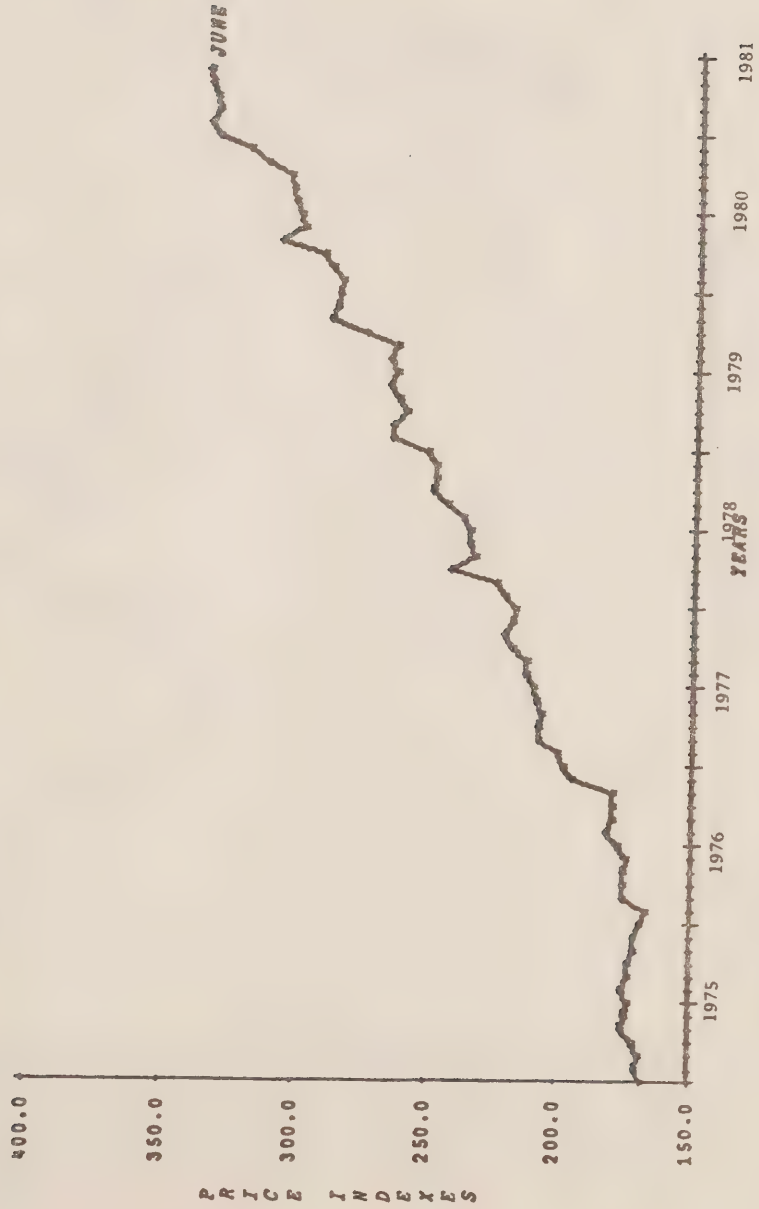
Source: Statistics Canada

MONTHLY SELLING PRICE INDEXES
WOOD-PULP, SULPHATE AND SODA, PAPER GRADES, BLEACHED, SOFTWOOD, FOR EXPORT



Source: Statistics Canada

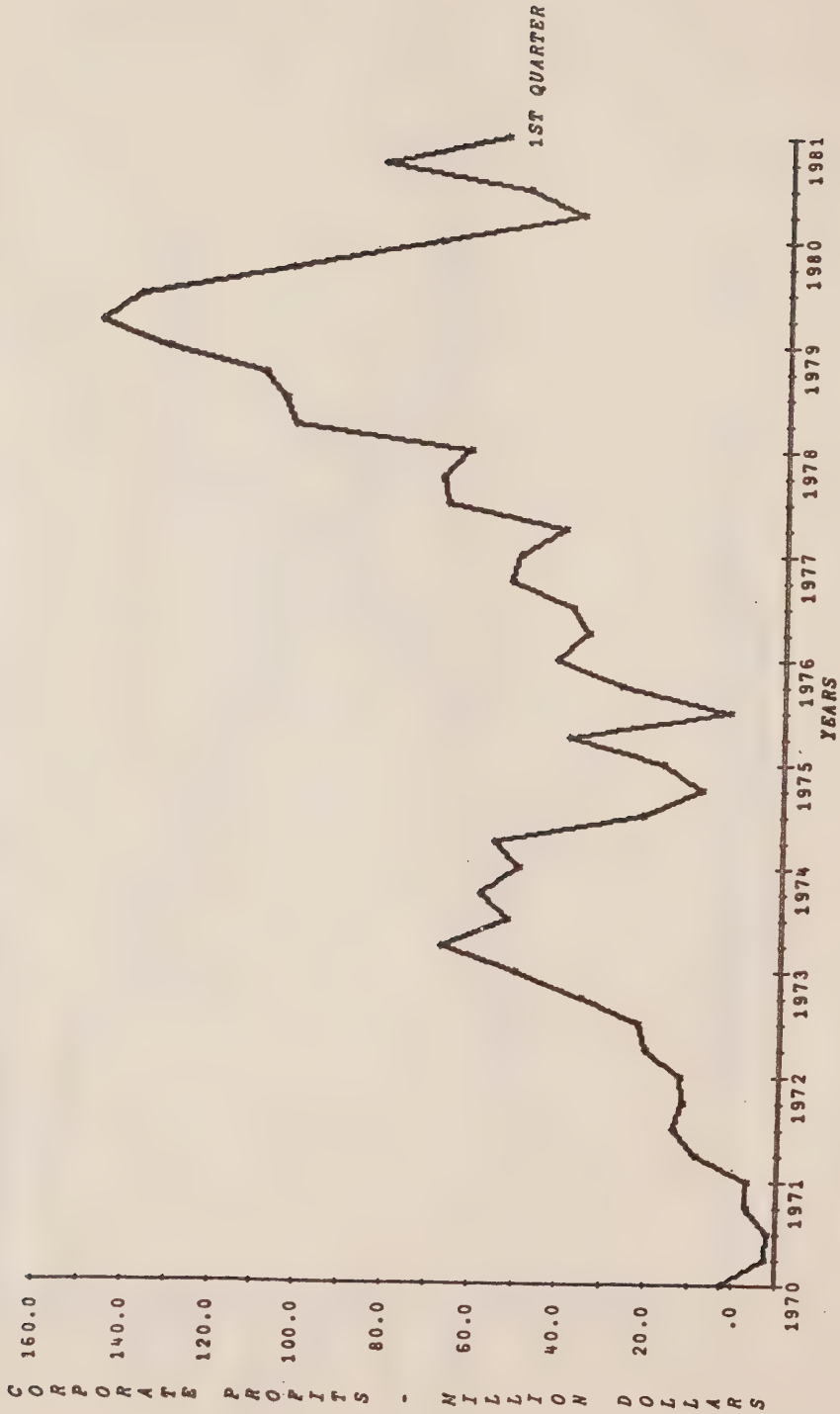
MONTHLY SELLING PRICE INDEXES
NEWSPRINT, WHITE IN ROLLS, FOR EXPORT



Source: Statistics Canada

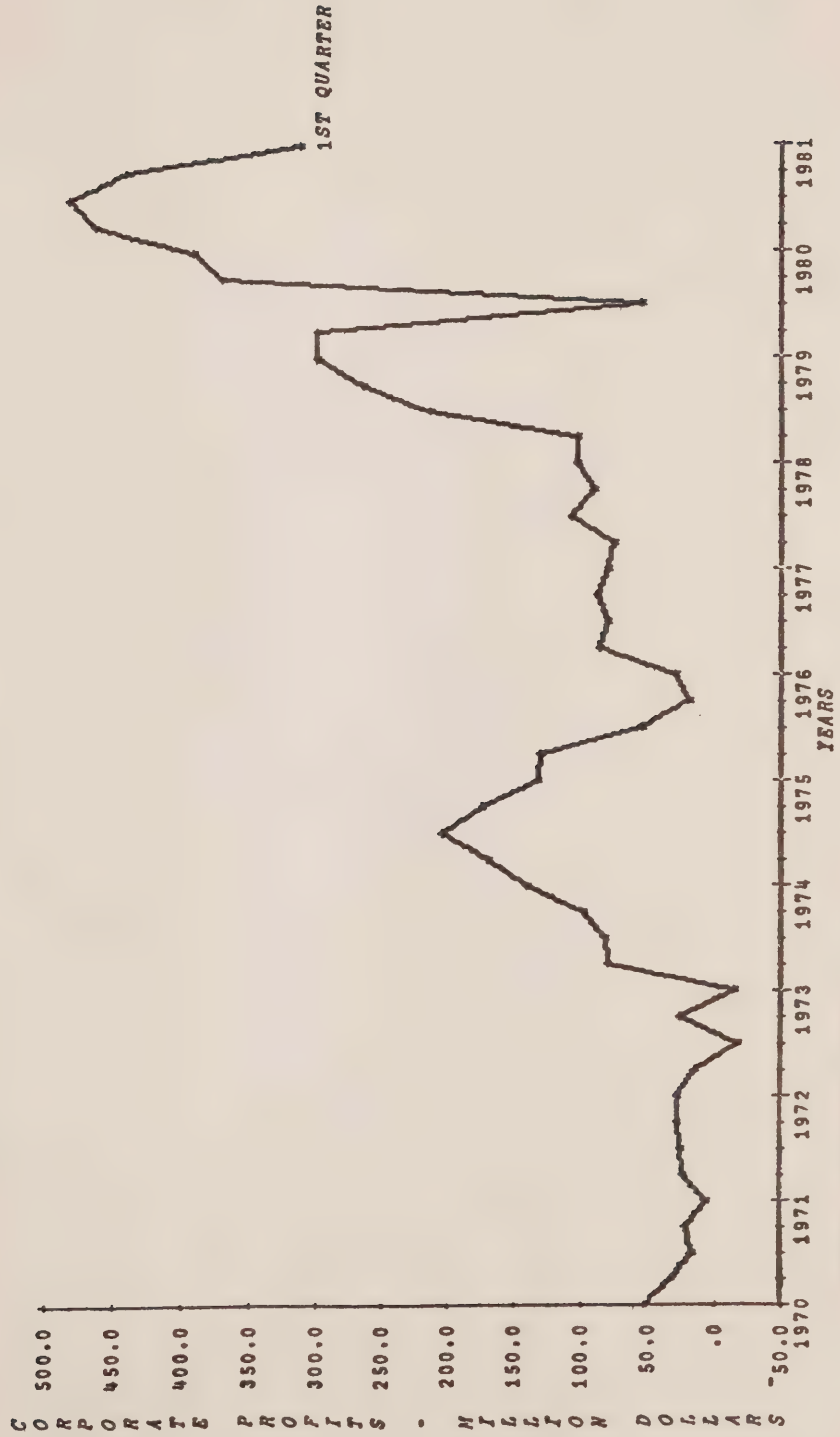
CHART 8

CORPORATE PROFITS - AFTER TAX¹
WOOD INDUSTRIES - INCLUDES FURNITURE



Source: Statistics Canada
1. QUARTERLY RATES SEASONALLY ADJUSTED

CORPORATE PROFITS - AFTER TAX¹
PAPER AND ALLIED INDUSTRIES, AND FORESTRY



Source: Statistics Canada
1. QUARTERLY RATES SEASONALLY ADJUSTED

